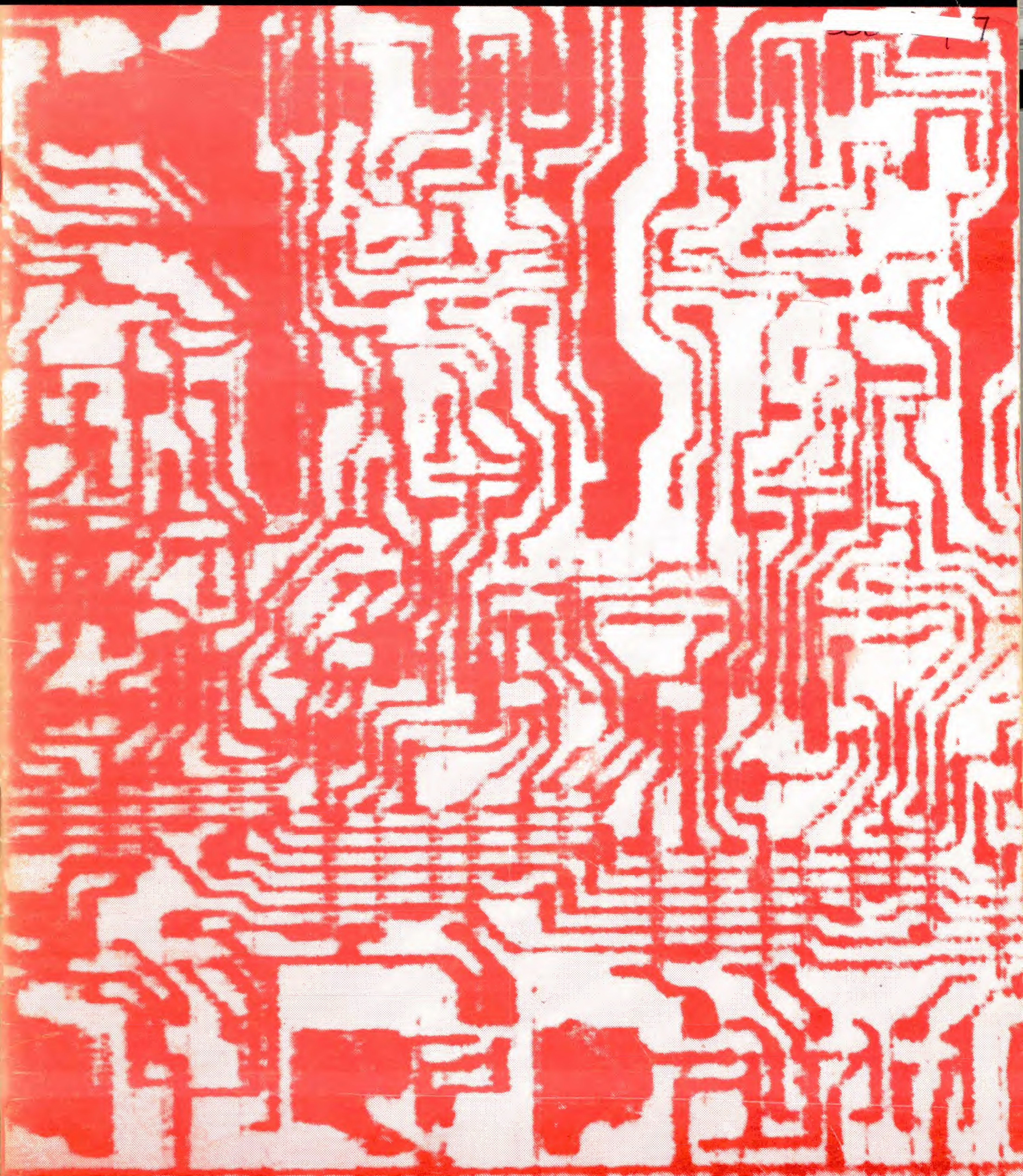


TRS-80 SYSTEM 80 VIDEO GENIE



MICRO-80

P.O. BOX 213, GOODWOOD, S.A., 5034, AUSTRALIA. TELEPHONE (08) 272 0966. PRICE: AUS. \$2.50, NZ. 3.00, U.K. £1.50

***** ABOUT MICRO-80 *****

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The purpose of MICRO-80 is to publish software and other information to help you get the most from your TRS-80, System 80 or Video Genie and their peripherals. MICRO-80 is in no way connected with either the Tandy or Dick Smith organisations.

**** WE WILL PAY YOU TO PUBLISH YOUR PROGRAMS ****

Most of the information we publish is provided by our readers, to whom we pay royalties. An application form containing full details of how you can use your TRS-80 or System 80 to earn some extra income is included in every issue.

**** CONTENT ****

Each month we publish at least one applications program in Level I BASIC, one in Level II BASIC and one in DISK BASIC (or disk compatible Level II). We also publish Utility programs in Level II BASIC and Machine Language. At least every second issue has an article on hardware modifications or a constructional article for a useful peripheral. In addition, we run articles on programming techniques both in Assembly Language and BASIC and we print letters to the Editor and new product reviews.

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The programs and other articles in MICRO-80 are published in good faith and we do our utmost to ensure that they function as described. However, no liability can be accepted for the failure of any program or other article to function satisfactorily or for any consequential damages arising from their use for any purpose whatsoever.

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***** EDITORIAL *****

*** TANDY MODEL III IN AUSTRALIA ***

Rumours abound concerning the arrival of the Tandy Model III into Australia. Officially, Tandy expects to release the Model III in May. Also officially, the Model I will continue. Unofficially, the Model III could well be released earlier, although that will be subject to shipping delays etc. Also unofficially, we believe that, shortly after the release of the Model III, the Model I will be dropped completely from Tandy Australia's range.

The price for the Model III has not yet been announced by Tandy. Our information is that the Level I/4K machine will sell for \$100 more than the Model I Level I/4K; ie. \$799. The 32K dual disk drive version is likely to sell in the \$2600-\$2800 range. Whilst these prices are still above those in the USA (LI/4K is US \$649), they are closer than previously and are another indication that Tandy is changing its pricing policy for the better.

What about software compatability? News coming out of the USA indicates some potential problems here. Firstly, Model I machine language programs which make use of ROM calls are almost certainly going to be useless on the Model III. There are even indications that some BASIC programs may present problems. Devices such as the Exatron Stringy Floppy will also need some substantial redesign since the 2K gap in the memory map which is used for the operating system just does not exist in the Model III which has a 14K BASIC interpreter rather than 12K as in the Model I. MICRO-80 has a model III on order in the USA (on back order actually!) and we are eagerly awaiting its arrival. Naturally, we shall inform all our readers of its capabilities and characteristics at the earliest opportunity.

*** SYSTEM 80 DEVELOPMENTS ***

Nor is the Dick Smith organisation being ignored by the rumour-mill although we are less certain of the reliability of our information in this case. One story is that there will soon be a super SYSTEM 80 all in one piece a la the Tandy Model III. Another part to this rumour suggests that this machine will have an Exatron Stringy Floppy installed as standard. Still other rumours suggest a colour model. In terms of hard facts, the Dick Smith organisation has sold over 2000 SYSTEM 80's since their introduction in May 1980. That is an average of about 300 units per month which, we guess, could be a little disappointing to D. S. E.

Tandy is very secretive about its level of sales but it is difficult to believe that it could be less than D. S. E.'s. Our guess, and it is a guess, is that Tandy is selling 500-600 Model I units per month. Anyway, whatever the true figures, it is clear that microcomputing in Australia is growing rapidly although not as explosively as it has in the USA and the UK.

*** MICRO-80's NEW PREMISES ***

MICRO-80 is bursting at the seams, as any of our Adelaide readers who have visited us could attest. We have therefore decided to move the whole operation into our new premises at 433 Morphett Street, Adelaide where we originally intended to locate just the MICRO-80 Computing Centre. As you can imagine, this is a fairly major operation and has been consuming a considerable amount of our time over the past few weeks. The effect has been to delay the publication of this issue and many of our readers who have telephoned have found that the telephone answering machine is in operation for much of the time. We hope you will continue to be patient for a little longer until we get the extra space and staff we need, when we will be able to have the 'phone manned by a human during normal business hours and your Editor will be able to spend much more of his time actually editing the magazine. One effect of the move will be a change in our 'phone number during business hours. As soon as we have the new number manned, we will announce it on the telephone answering machine. So, if you are in the habit of hanging up the moment you realise that there is an answering machine on the line, perhaps you had better hold on a little longer to hear the number to call.

In the meantime, we are happy to announce the appointment of Fred Miller as Sales Manager. Fred has had considerable experience in servicing customers in a number of different industries and is very familiar with the TRS 80/SYSTEM 80. Fred will take responsibility for the MICRO-80 Computing Centre and also the MICRO-80 PRODUCTS mail order business. We are sure that Fred will quickly become a part of our team and will improve the standard of service to our customers even further.

*** THIS MONTH'S MAGAZINE ***

There has been a great deal of interest in the machine language programs we have published in past issues. So this month, we have published two ml. programs, both well documented and commented. A well-commented assembly language source listing takes a lot of space so one or two other features have had to be held over to make room. These include Disk Drives - Questions and Answers (Part 3) and Input/Output. These will return next month and, of course, we are also expecting the next instalment of GT BASIC for that issue.

REVIEW OF ESCON SELECTRIC CONVERSION by David Grigg

Ever since I bought my TRS-80, one of the main uses I have had in mind for it was as a word processor. In my spare time, I am a fiction writer and as I am also carrying out a correspondence course at university level, I end up doing an awful lot of typing. I've had a typewriter since I was 12 years old, so by now I ought to be able to type fairly well. But like all typists, I make a lot of mistakes. And every time I made a mistake when I was typing a clean final copy of a story or an essay, I would have to stop, use white-out fluid, wait for it to dry, type over the mistake and only then carry on typing again. This slowed me down enormously. So the idea of a word processor certainly appealed to me.

I have owned an IBM Selectric typewriter for about five years and found it an excellent machine. So when I bought the TRS-80, and found out that there was a way to hook up the computer to the IBM, I was very pleased. There was only one problem and that was the cost. I had to wait for a year before I could save enough for the conversion (after all, I had just gone out and spent \$1000 on the TRS-80!).

In August last year, however, I finally had enough.

The Escon conversion to the Selectric is marketed by ASP Microcomputers, of East Malvern, Victoria. The complete conversion kit, including solenoid assembly, manuals and Universal Interface, cost (last I heard) \$729. If you want ASP to install the solenoids in your typewriter, it will cost you an extra \$100. Now, here's the first point. That extra \$100 is well worth it. I attempted to install the solenoids myself, much to my later regret.

The advertising for the conversion says that it takes about 4 hours to install the solenoids and adjust them. I think that's 4 hours for their own expert, who installs two conversions a day. Five evenings after I first opened up the IBM and started unscrewing, attaching, hooking and soldering, I had the typewriter printing alright. Printing garbage! The thought of any further work, especially delicate adjustment, was beyond me. I sent the typewriter to ASP and let them finish off the adjustment.

It was probably a good thing that I did because my slightly aging IBM decided that it didn't like all this fiddling around with it and developed a fault of its own, unrelated to the solenoid additions but I think, related to the movement and joggling that it had been getting. An IBM service call fixed that (a point very much worth noting is that IBM will honour their service agreements on ESCON converted typewriters). But if that problem had occurred while I was working on the machine, I probably wouldn't have figured out what was going wrong.

Certainly, I spent rather more than \$100 worth of frustration and anxiety in trying to install the solenoids myself. But then, I am not a very handy person, nor are my mechanical skills very good. If you are used to disassembling motorbikes, clocks or typewriters, you may well save yourself something by doing the conversion yourself.

How well does it work now the solenoids have been installed? Well, there's now a little black box between my cassette port and my cassette deck, with a switch on it which has to be selected between TAPE and PRINT. And between that box and the typewriter, there's a large blue box, with lots of electronics in it (including a 6502 microprocessor). That sounds like a lot of hardware but it doesn't take up much room on the desk and it works beautifully. Given a tiny software driver, I can LPRINT or LLIST immediately. And given the excellent TASP program marketed by ASP for the Exatron Stringy Floppy (there are disk and cassette versions, too), word processing is a snap.

The TASP wp program, written by Peter Darling, is really an excellent piece of work. I haven't had any experience with Tandy's SCRIPSIT but I have with Electric Pencil and as far as I'm concerned, TASP beats Pencil easily, and it's cheaper, too! TASP enables you to enter formatting commands along with text so that, for example in an essay, you can set all quotes in indented margins with very little effort. Justified margins, if you want them, of course; hyphenation or not, as you will; page headings and automatic page numbering, again optional; pro-forma letters with changing inserts; you name it, TASP has it. Indeed, the main problem is becoming familiar enough with the manual. Text is entered straightforwardly, with a destructive backspace key. One feature TASP omits deliberately is that annoying Pencil habit of cutting off letters when you are typing fast at the end of a line: the screen is just considered to wrap around, which doesn't take much getting used to.

TASP also has an excellent editing feature, which allows you to insert, delete, re-order lines, search for particular letters, just about everything Pencil has and possibly more. These functions are based on an extended set of the normal Microsoft editing commands for BASIC text (TASP text is stored automatically as BASIC program lines). A delight to use.

And the whole system, together? Well, this review has been written and edited using TASP and printed out using the ESCON conversion to my IBM. I wouldn't write any other way.

I'm not certain of this, but I'm fairly sure that TASP would work equally well with other printers than the ESCON converted Selectric. Price is about \$75. (David is right about the price - TASP is available from MICRO-80 PRODUCTS - Ed.)

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ESCON - PLUS SCRIPSIT - A FEW COMMENTS by David D. Harris

With a small business having a typing requirement which is ideal for word processing, I set about finding the cheapest, reliable way of achieving it. After some research I purchased a TRS-80 (Model 1) using Tandy's scripsit W/P program. As a printer I use an IBM Selectric typewriter which I already owned, converted with an Escon interface unit.

In general, I am very happy with this set-up. Scripsit is very versatile, easy to use and bug-free and deserves all of the praise it currently seems to be getting.

The Escon interface? Ah, thereby hangs a tale!

I bought the interface from Computer Marketing, the S.A. agent for ASP Microcomputers. I elected to install it myself. I am only moderately handy but succeeded in having it running after about a day of work. The instructions are quite explicit and, although adjustment is rather critical, it is not difficult.

It is a little frightening having to delve into the bowels of the typewriter to install the driving solenoids but it is very instructive in showing how the IBM typewriter works. This knowledge has come in handy since!

As an overall operating system my experience is that the Escon/Selectric set-up has some plusses and some minuses.

On the plus side -

The Selectric is a very good and highly developed typewriter. It has available a wide range of type faces and has a full IBM service back-up which is unaffected by the installation of the Escon interface.

The Selectric can be used as a typewriter when standing alone and also when connected to the computer - even when the computer is outputting to it so long as printing is halted at the time. This is very handy for underlining, correcting minor mistakes etc.

On the minus side:-

I feel that the reliability of the electro-mechanical part of the interface (the solenoids and linkage) is marginal for routine use in an office. I have had two links break, as well as occasional problems with, for example, links touching sound absorbing pads within the typewriter. This is not too bad if someone handy is around to replace a link (about a half hour job when you've done the first one), or otherwise trouble-shoot the occasional problem.

Another irritation, applicable to any typewriter conversion and certainly not a fault of Escon, is that printing is very slow. The first time you operate the printer, its 15 characters per second seems fast. When you get used to it and you realise that it takes around 4 minutes to print a page you long for something with dot-matrix printer speed and typewriter quality. Unfortunately, ain't no such animal.

I have added two features to the system which make it more appropriate to an office environment -

A heavy-duty plug in the data cable. This allows the typewriter to be easily and frequently unplugged from the computer and moved around the office, which is necessary for stand-by use as a pure typewriter. Incidentally, NEVER unplug it while the computer is switched on unless you enjoy replacing burnt-out diodes!

An IBM sound absorbing kit. Without this it is just too noisy for an office. Somehow it seems noisier as a printer than as a pure typewriter, or maybe it's just the fact that its operation is continuous.

When used with Scripsit the Escon system has a whole further range of idiosyncracies, all of which boil down to the fact that it does not recognise the end-of-line marker as requiring a line feed (ie, rotation of the typewriter platten) unless it has at least one character before it in the line. This means that many of the goodies mentioned in the Scripsit instruction manual don't work as the book says. These include -

- Line feeds from a succession of "Enter" key-ins.
- Paragraph Format (PF) instruction.
- Header and Footer blocks.
- Top and bottom margin settings, etc.

Some can be made to work by inserting a space before the line end marker and in fact, for my use this is perfectly adequate to get almost all I could want out of Scripsit. It remains as a minor annoyance.

I have now been made aware that this problem can be fixed by:

Machine language patches, of which I now have a large collection.

Getting a replacement PROM from Escon which is designed to fix the problem. I know a number of people who have solved it this way. However, the PROM I received from Escon does not work. We are still negotiating!

Buying the most recent Escon interface which no longer seems to have the problem. These have only been available in Australia for a few months, I believe.

Overall, I would have to say that the Escon interface does the job very well so long as it is not to be left to a junior typist to operate as an idiot-proof system. If used by its owner, and especially if the owner installed it, it does all one could ask at a reasonable price.

Its other giant advantage is its use of the IBM typewriter. Without the ready availability, reliability and service back-up of this unit together with the range of type faces, ribbons etc. which are available for it, the Escon system would not be so attractive.

What are the alternatives? Well, in the USA there are other IBM Selectric conversions but Escon is the only one I know of which is available in Australia. Don't overlook the fact that American electricity is 110v, 60Hz.

Tandy's Daisy Wheel printer is about twice as fast but does not have the versatility (as it can't be used as a pure typewriter) and costs about half as much again as the Escon interface plus a NEW Selectric typewriter. Most people don't buy a new one but convert an existing or second-hand typewriter which usually saves a lot of money.

If you need typewriter quality output, that's it.

So far, not much has been said about Scripsit. In this article it won't be! Suffice it to say that I am using it in an office where W/P must pay its way. Scripsit does this admirably even within the basics covered in the Instruction Book. However, once fluency is gained with it and a little creative thought is applied, there is a whole area of versatility beyond the basics which makes it a delight to use.

(David has recently taken delivery of an OLIVETTI ET-121 typewriter with MICRO-80 interface. Once he has had time to familiarise himself with this machine, he has promised us an objective review of that, too - Ed.)

LNW RESEARCH EXPANSION INTERFACE BOARDS

\$79.95 + \$2.00 P&P

There was so much interest shown in the LNW Research expansion project described in September's MICRO-80 that we decided to import the boards to Australia. They proved so popular that the first batch sold out within 12 hours of landing! We are in stock again, so hurry, while they last. These boards are the basis for a high quality, reliable expansion interface for the TRS-80 (or the SYSTEM 80 via our SYSPAND-80 adaptor). At present we are offering the boards with their comprehensive construction manual. By next month, we will be able to offer modular kits of components and fully built up and tested units. The design of these boards is tried and tested. An expansion interface built around one costs \$100's less than an equivalent Tandy or D-S interface.

***** READERS' REQUESTS *****

This column is a regular feature of MICRO-80. In it, we list all those articles, programs, etc. requested by our readers. We invite contributions from Readers to satisfy these requests and will, of course, pay a publication fee for all articles, programs etc. printed. As a guide, we will pay a minimum publication fee of \$10 for any article or review published. In the case of software reviews, we will aim to pay in accordance with the value of the program, up to a maximum of \$25. So, if you write a good review which we publish and the usual selling price of the program in Australia is \$19.95, then we would pay you \$20. In that way, the successful reviewer will get the program he reviews, free. (Make sure you include the selling price in your review). Unfortunately, we cannot afford that policy on hardware(!) so we will pay in accordance with the merits of the review - generally of the order of \$25. Submission of a review for publication automatically means that you are prepared to accept the figure we decide to pay you and no correspondence will be entered into. Payment will be made within 30 days of publication.

** ARTICLES **

- File handling on the '80
- Description of the functions performed by the Expansion Interface
- Reviews of '80 compatible printers
- Reviews of commercially available software (including that produced by us!)
- Reviews of commercially available hardware
- * How to SAVE onto Disk, programs such as Analogue clock and Touchtype
- * A master index to the appropriate sections in the Tandy Manuals in Level I, Level II, DOS etc.
- Comparative reviews of disk drives
- How to convert a Level I program to Level II
- A simple guide to using Level I Arrays
- * Review of Dunjonquest program
- An explanation of how to make full use of USR, PEEK and POKE statements

** SOFTWARE **

- * A m.l. program to enable the break key to work like RESET when using an expansion interface
- Stock market program
- * Horse racing system
- "Files" program modified for 48K system
- Morse code decoder
- Sub-routine F0rum
- Program to "SET" non-graphical symbols
- A new STAR-TREK game
- Conversational programs (like Eliza)
- 3D programs (such as a maze seen from the inside)

** HARDWARE **

- Interfacing the '80 to external hardware
- Review on the performance of line filters
- Real Time clock
- * Radio Teletype/Morse interfacing
- RFI (Radio Frequency Interference) suppression
- Interface for a Teletype printer

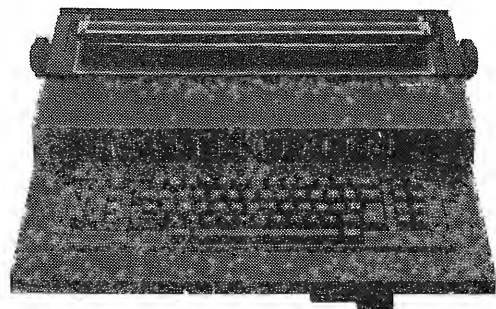
Note:- An * denotes that we already have some suitable material on hand for this topic.

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Daisy Wheel Typewriter/Printer

MICRO-80 has converted the new OLIVETTI ET-121 DAISY WHEEL typewriter to work with the TRS-80 and SYSTEM 80 or any other microcomputer with a Centronics parallel port (RS 232 serial interface available shortly). The ET-121 typewriter is renowned for its high quality, fast speed (17 c.p.s.), quietness and reliability. MICRO-80 is renowned for its knowledge of the TRS-80/SYSTEM 80 and its sensible pricing policy. Together, we have produced a dual-purpose machine:- an attractive, modern, correcting typewriter which doubles as a correspondence quality Daisy-wheel printer when used with your micro-computer.

How good is it? - This part of our advertisement was typeset using an ET-121 driven by a TRS-80. Write and ask for full details.



ONLY \$1995 INC. S.T.

***** MICRO-BUGS *****

In which we correct those errors which seem to creep in, no matter how careful we are.

We'll not really bugs this month, rather modifications which will allow previously published programs to run on the SYSTEM 80 as well as the TRS-80. We have had letters from a number of readers with similar information. This one from David Weaver was one of the first to arrive, so we have published it. We thank all those who took the trouble to write in.

** AMENDMENT TO RON SULLY's SOUND EFFECTS PROGRAM (July 1980) **

Although both the TRS-80 and the SYSTEM 80 use address FFH as the cassette port with bits B0 and B1 for the data, the machines differ in their use of bit B2. In the TRS-80, B2 is used solely for cassette motor control. In the SYSTEM 80 it is also used to enable data paths to both recorders. UNLESS this bit is set high (B2=1) in the SYSTEM 80, NO OUTPUT DATA can pass from the computer to the external recorder socket and NO INPUT DATA can pass from the internal deck to the computer. BIT B2 MUST be set high EACH TIME OUTPUT DATA is fed to port FFH.

To alter SOUND EFFECTS to run on a SYSTEM 80, change Line 10 as follows:-

```
10DATA221,33,36,67,221,78,0,121,183,200,221,70,1,62,5,211,255,16,254,221,70,1,6,211,255,16,254,13,19
4,253,66,221,35,221,35,1,255,255,33,48,0,9,218,29,67,195,247,66
```

This alteration keeps bit B2 high by changing B0 value from 1 to 5 and the B1 value from 2 to 6. If no change-over switch is fitted to the the SYSTEM 80 to change cassette ports then OUT 254,255 must be typed in.

** AMENDMENT TO C. E. KENDALL's KEYBOARD BLEEPER PROGRAM (November 1980) **

This program requires the same alteration as SOUND EFFECTS. To alter KEYBOARD BLEEPER, change Line 40 to:-

```
40 DATA
195,96,64,205,227,3,183,200,8,14,20,68,62,5,211,255,16,254,68,62,6,211,255,16,254,13,32,239,8,201,20
5,127,10,205,101,64,201
```

Again, if no switch has been fitted to change over the cassette ports, then OUT 254,255 must be typed in.

** ALTERATION TO RUN John Peschar's DRAW II PROGRAM ON THE SYSTEM 80 **

David also included this alteration in his letter. DRAW II requires the use of the forward arrow key which is not present on early SYSTEM 80's. This modification makes use of the GREATER THAN and LESS THAN keys instead of the forward and back arrow keys. There is no reason why these modifications should not work equally as well on a TRS-80.

To alter DRAW II, make the following alterations to Lines 10, 40, 70, 130, 140, 240 and 250.

```
10 CLS: CLEAR 500: DEFINT X,Y,B-Z: DEFSTR A : SET(X,Y): V=14400: W=14368
```

```
40 IF B=91 OR B+10 OR B+46 OR B=44, F=0 ELSE IF B=26 OR B=27 OR B=60 OR B=62, F=1
```

```
70 IF B=108 THEN 500 ELSE IF B=115 THEN 400 ELSE IF B=99 THEN CLS ELSE IF B=110 THEN 600 ELSE IF
B=100 THEN 300 ELSE IF B=114 THEN A1="" :C=0
```

```
130 IF (B=60 OR B=44) AND X-1>=0, X=X-1
```

```
140 IF (B=62 OR B+46) AND X+1<=127, X=X+1
```

```
240 IF (PEEK(W) AND 16)=16 AND X-1>=0, X=X-1 : E=1
```

```
250 IF (PEEK (W) AND 64)=64 AND X+1<=127, X=X+1 : E=1: RETURN ELSE RETURN
```

** ALTERATION TO RUN A. F. WEST's SOUND PROGRAM ON THE SYSTEM 80 (July 1980) **

Allan Smyth was another reader who sent in similar amendments to KEYBOARD BLEEPER. In addition, he included the following amendment to SOUND to enable it too to work on the SYSTEM 80. First, add OUT 254,16 to your BASIC program then, at the bottom of page 43, change the line of HEX to:-

```
7FE0 00 00 CD 7F 0A 3E 01 0E 00 1E 04 00 00 45 2F E6
```


***** '80 USERS' GROUPS *****

The following is a list of '80 Users' Groups. If you have a group that is not included here, please let us know about it so that we can publish details. Owners of System '80s are welcome at all the groups.

- BRISBANE: Contact: Mr. Lance Lawes,
Tel: Home (07)396 2998
Bus. (07)268 1191 Ext.15
MEETINGS: 1st Sunday of the month at 2 p.m. at 21 Rodney St. Lindum,4178.
- MELBOURNE: EASTERN SUBURBS - 1
Contact: Mr. John Fletcher, 89 0677 between 9-4

EASTERN SUBURBS - 2
MEETINGS: 3rd Wednesday of the month at Kingswood College, 355 Station St. Box Hill.

NORTHERN AND WESTERN SUBURBS COMPUTER USERS GROUP
MEETINGS: Every 2nd Thurs. at 7 pm. at 142 Pascoe Vale Rd., Moonee Ponds
Contacts: David Coupe (03) 370 9590
Clive Budd (03) 370 2917
- FRANKSTON: PENINSULAR GROUP
(Vic)
MEETINGS: 2nd Tues. of the month (except Jan.)
Contact: M.G. Thompson (03) 772 2674
- GEE LONG: GEE LONG COMPUTER CLUB
MEETINGS: 2nd Tues. of the month at TYBAR Engineering, Hampton St. Newtown.
Contact: The Geelong Computer Club,
P.O. BOX 6, Geelong, 3220
- DARWIN: Contact: Tony Domigan, P.O. Box 39086,
Winnellie, N.T.5789.
- ADELAIDE: Contact: Rod Stevenson, 51 5241 between 9-4.
- CANBERRA: MEETINGS: 3rd Thurs. of each month at 7.30 pm in:-
Urambi Village Community Centre, Crozier Circuit, Kambah.
Contact: Bill Cushing, 10 Urambi Village, Kambah, ACT 2902. ('Phone 31 6399)
- TOWNSVILLE: TOWNSVILLE AMATEUR RADIO CLUB
MEETINGS: 2nd Tues. of the month at 7.30 pm at:-
The State Emergency Service Headquarters,
Green St., West End.
Contact: F.G. Sturges, P.O. BOX 5100 MSO, Townsville

** UNITED KINGDOM **

NEWCASTLE: NPCS (Newcastle Personal Computer Society)
Contact: John S. Bone 0632 770036

** NEW ZEALAND **

AUCKLAND MEETINGS: 1st Tues. of each month at:-
NZ Solenoid Co. Ltd.,
28 Kalmia Street, Eilerslie, Auckland.

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***** INPUT/OUTPUT *****

FROM: Ron Kehn, 27 Guys Rd., Korumburra, Vic. 3450

I recently purchased an RS 232 board for my TRS-80 expansion interface. It was my hope to connect the TRS-80 to an integral data IP 125 printer. I copied the software I/O driver as per the RS 232 manual but I am unable to get anything printed out. If you (or any reader) have attached the TRS-80 to the IP 125 serial printer I would appreciate hearing what you did to modify the software and/or hardware.

(If any reader has solved this problem, perhaps they would contact Ron direct - Ed.)

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***** MARKET PLACE *****

Market place is available to any reader who has hardware to dispose of. An entry costs nothing - you pay MICRO-80 \$5.00 or 5% commission, whichever is the greater - up to a maximum of \$30, after the goods are sold. The commission is calculated on your advertised price.

EXATRON STRINGY FLOPPY, excellent condition. Includes wafers. ***** \$300 *****
Phone (089) 89 6016 (Business) ask for Peter Quinn

SYSTEM 80 L2/16K + Dick Smith monitor + Address/Mailing list and Airmail Pilot programs. This equipment is only a few weeks old and in perfect condition. Total list price of hardware and software is \$951.50, will sell for:

***** \$850 *****

P. S. Martin, 191 Stuart Street, Blakehurst NSW 2021 Phone (02) 546 7090

Radio shack QUICK PRINTER: 150 LPM on 4.75" wide aluminised paper. Software selectable 80,40, or 20 characters per line. Upper-case and lower-case with full descenders. Automatic underlining. Seldom used and in excellent working order. Catalogue price \$699. Will sell for:

***** \$400 *****

Mike Riley, 15a Hunter Street, Lakes Entrance Vic. 3909. Phone: (051) 551812 Bus. (051) 552216 (AH)

MICROLINE 80 DOT MATRIX PRINTER: excellent condition with printer cable, ready to plug into bus extender and go. Full graphics, 3 print sizes and detailed instructions and tips.

***** \$850 o.n.o. *****

Mr. J. F. Lamich, 116a Raglan Street, Mosman, NSW 2088. Phone: (02) 411 7166 Bus. hours.

- 00000000000 -

***** SOFTWARE SECTION *****

SHOOTING GALLERY (L1/4K)

by C. Stobert

The game starts by first drawing some reeds at the bottom of your screen. The sub-routine for this starts at Line 800. At Line 250, each shooting position is placed on the screen (in the space between each set of reeds). Lines 320 to 350 decide where the ducks are to appear whilst Lines 360 to 370 place them on the screen. Line 410 is the start of the INKEY simulator. For new readers, this is done by SETting various points on the screen, placing the cursor so that, if a certain key is pressed, one of the points is overwritten by the cursor, then acting according to whichever point is missing. Line 415 is testing point (3,0). If (3,0)=1 (ie. if it is ON), 415 is repeated. If (3,0)=0 (ie. if it is OFF), the program drops to the next line. As you can see from the REM statement at Line 500, this is the start of the shoot trace. L is the next position on the Y axis and P is the next position on the X axis. Line 520 increments P and then decides whether there is a duck present at the next position to be occupied by the bullet. This test is not really necessary. It has been added to demonstrate that you can make your '80 look for a duck before the bullet actually gets there. Line 540 tests each point adjacent to the bullet, horizontally (that is why the earlier test is not necessary). If one of the ducks is hit, then Line 600 is used. Line 680 decides whether there has been an even number of hits. Happy shooting!

```

1 REM C.STOBERT
2 REM 21 SHERWOOD CRS. NTH. DANDENONG VIC. 3175
10 C.
20 P.A.209,"<<< SHOOTING GALLERY >>>"
30 F.I=1T075:J=R.(32767):N.I
40 D.5,1,15,2,46,3,60,4,960,A,992,B,1014,C
50 C.:P.:P."TWO DUCKS WILL APPEAR ON THE SCREEN
60 P.:P."YOUR FIRING POSITIONS WILL APPEAR ON THE
70 P."BOTTOM OF THE SCREEN
80 P.:P."WHEN THE DUCKS APPEAR
90 P."YOU FIRE BY PRESSING THE APPROPRIATE KEY
100 P.:P.:I."PRESS <ENTER> TO CONTINUE ";A$:C.
110 F.N=1T07:READA,A$
130 P.A.A,A$,:N.N
140 P.A.128,"PRESS <ENTER> TO SHOOT ON LINE B-1":P.
150 P."PRESS <SPACE> TO SHOOT ON LINE B-4":P.
160 P."PRESS <J> TO SHOOT ON LINE C-2":P.
170 P."PRESS <I> TO SHOOT ON LINE A-3":P.
180 P.:I."PRESS <ENTER> TO CONTINUE ";A$:C.
190 P.:P."YOU HAVE 10 SHOTS
200 P."TO SHOOT AS MANY DUCKS AS POSSIBLE

```



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210 P.:P."AFTER AN EVEN NUMBER OF HITS
220 P."TWO NEW DUCKS WILL APPEAR ON THE SCREEN
230 P.:P.:I."PRESS <ENTER> TO START ";A$:C.
240 GOS.800
250 F.N=46T047:S.(0,N):S.(64,N):S.(109,N):N.N
260 S=0:H=0
300 REM- PLACEMENT OF DUCKS
310 F.N=128T0704S.64:P.A.N:N.N:P.A.1,
320 V=R.(30)+3
330 W=R.(7)*3+6
340 X=R.(86)+20
350 Y=R.(3)*3+21
360 F.N=V-2T0V+0:S.(N,W):N.N:S.(N,W-1)
370 F.N=XTOX-2S.-1:S.(N,Y):N.N:S.(N,Y-1)
400 REM- FIRING CHECK
410 P.A.1,:F.N=1T07S.2:S.(N,0):N.N
415 GOS.1000:IFP.(3,0)G.415
420 IFP.(7,0)=0Z=64:J=-3.92:G.500
430 IFP.(5,0)=0Z=64:J=4.15:G.500
440 IFP.(1,0)=0Z=109:J=-5.77:G.500
450 IFP.(3,0)=0Z=0:J=6.69:G.500
460 G.415
500 REM- SHOOT TRACE
510 S=S+1:P=Z:F.L=42T06S.-3
520 P=P+J:IFP.(P,L)G.600
530 S.(P,L):IFL>32G.580
540 IF(P.(P+1,L))+(P.(P-1,L))G.600
580 GOS.1000:R.(P,L):N.L:IFS=10G.700
590 G.410
600 REM- HIT SEQUENCE
610 H=H+1:F=I.(L/3)*64+I.(P/2)-66
620 F.B=1T03
630 F.N=-R.(3)TOR.(3)S.R.(3):S.(P,L+N):S.(P+N,L):N.N
640 F.C=FTOF+128S.64:P.A.C," ";A.0;:N.C
650 N.B
670 IFS=10G.700
680 IFI.(H/2)=H/2G.310
690 GOS.1000:G.410
700 REM- END OF SHOTS
710 P.A.258,"YOU HAVE HAD YOUR 10 SHOTS
720 P.A.324,"YOU SCORED";H;"HITS
730 P.A.456,:IFH>8P."MARKSMAN
740 IFH>4P."FAIR SHOOTING":G.750
750 P."L@@K OUT FELLOW HUNTERS
760 Y=1:N=0
770 P.A.600,"WANT ANOTHER TRY- (YES OR NO) ";:I.D
780 IFD=0E.
790 G.260
800 REM- REEDS
805 F.N=6T058:S.(N,47):S.(N,46):N.N
810 F.N=70T0103:S.(N,47):S.(N,46):N.N
815 F.N=115T0127:S.(N,47):S.(N,46):N.N
820 M=45
825 READN:IFN=999M=M-1:G.825
830 IFN=9999RET.
835 S.(N,M):G.825
840 D.17,18,24,25,26,27,28,29,35,36
845 D.37,38,39,44,45,76,81,82,84,89
850 D.90,99,118,119,120,121,122,123,125,999
855 D.14,16,17,18,24,25,26,27,28,35
860 D.36,37,38,39,44,45,72,75,76,80
865 D.82,84,89,90,96,98,100,119,120,121
870 D.123,126,999
875 D.15,18,24,26,27,35,36,37,38,39
880 D.44,46,50,73,74,79,82,84,87,89
885 D.91,97,98,118,119,120,121,123,127,999
890 D.18,22,24,26,27,30,34,36,37,38
895 D.39,44,47,48,49,78,82,84,88,89
900 D.91,94,114,117,119,120,121,123,127,999
905 D.17,18,22,23,24,26,28,29,33,36
910 D.37,38,39,45,75,77,82,84,92,93
915 D.115,116,119,121,124,999
920 D.24,26,32,36,39,46,47,48,49,76
925 D.77,81,84,119,121,125,999

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930 D.25,26,29,31,36,38,40,81,84,117
935 D.119,122,126,999
940 D.30,31,36,38,40,43,80,84,86,118
945 D.119,122,123,999
950 D.35,36,38,40,41,42,78,80,84,85,999
955 D.36,38,79,80,9999
1000 REM- DUCK MOVEMENT
1010 S.(U+1,W-1):R.(U-2,W)
1020 S.(X-3,Y-1):R.(X,Y)
1030 S.(U+1,W):R.(U,W-1)
1040 S.(X-3,Y):R.(X-2,Y-1)
1050 U=U+1:X=X-1
1060 IFX>2RET.
1070 F.Q=0T03:F.R=Y-1TOY:R.(Q,R):N.R:N.Q
1080 X=127:RET.

```

MATURITY TEST (L1/4K)

by Br. P. Van Eeken

Everyone else is asking questions to test this and that, now it is our turn. The big question; how mature are you really?. By answering all the questions posed in this program, you will be able to find out. (If you get a low score, this is only for fun, isn't it?).

The program works in the following manner:-

Line 4 zeros all arrays from A(0) to A(25), this is where your answers will be stored. The questions start at Line 10 and finish at Line 135. Once all the questions have been answered, the program jumps to Line 800 which tells you your score, what that score means and asks you to press (ENTER). Once you press (ENTER), the program goes to Line 200 and asks: "would you like a run down of your answers?". If you answer yes, it goes back to Line 10 then proceeds to tell you how much you scored for each question and your cumulative score. If you answer no, the program asks the next person to press (CLEAR). If you would like to see similar programs published, please let us know. If you have already written a similar program, why not send it in?

```

1 REM BY BR. P. VAN EEEKEN
2 C.
3 I."PRESS ENTER";A$
4 F.X=0T.25:A(X)=0:N.X
5 Y=0:N=1:S=0:C=0:B$=DO YOU
6 Z=0:J=3:G=0:F=1
7 C.
8 P."AFTER YOU ANSWER THE FOLLOWING 25 QUESTIONS, I WILL
9 P."BE ABLE TO TELL YOU HOW MATURE A PERSON YOU ARE.
10 P.AT512,"DO YOU FEEL THAT YOU CAN ALWAYS DO THINGS BETTER
11 P."THAN ANYONE ELSE";:GOS.500
15 P."OFTEN APOLOGIZE: I HAVE SUCH A POOR MEMORY";:GOS.500
20 P."OFTEN USE THE EXCUSE: IF I ONLY HAD MORE TIME";:GOS.500
25 P."FREQUENTLY SAY: I'M JUST NOT SOCIABLE";:GOS.500
30 P."OFTEN SAY: I CAN NOT DO IT";:GOS.500
40 P."OFTEN SAY: I INTENDED TO DO IT";:GOS.500
45 P."EXCUSE YOURSELF WITH: I CAN NOT HELP IT";:GOS.500
50 P."EXCUSE YOURSELF WITH: I'M TOO TIRED";:GOS.900
55 P."MUST YOU BE CONSTANTLY ENTERTAINED";:GOS.900
60 P."MUST YOU USUALLY BE THE CENTRE OF ATTRACTION";:GOS.500
65 F=4:P."ALWAYS TRY TO TELL OTHER PEOPLE WHAT TO DO";:GOS.500
70 P."ANGER QUICKLY";:GOS.500
75 P."OFTEN SAY: PEOPLE ARE NOT FRIENDLY";:GOS.900
80 P."IS IT HARD FOR YOU TO ADMIT YOU ARE WRONG";:GOS.900
85 P."IF YOU DON'T LIKE A PERSON, DO YOU REFUSE TO DEAL";
86 P."WITH THEM";:GOS.500
90 F=2:P."EXPECT EVERYONE TO LIKE YOU";:GOS.500
95 P."ASSERT: I DON'T NEED ANYONE'S HELP";:GOS.500
100 P."ALWAYS EXPECT GRATITUDE";:GOS.500
105 P."FREQUENTLY SAY: IT WAS MY IDEA";:GOS.500
110 P."FREQUENTLY GET INTO ARGUMENTS";:GOS.900:F=1
115 P."MUST YOU HAVE EVERYTHING YOU WANT";:GOS.900
120 P."HAVE YOU A DRIVE FOR PERFECTION";:GOS.900
125 P."MUST YOU ALWAYS HAVE THINGS YOUR WAY";:GOS.900
130 P."DOES SOMEONE ELSE'S SUCCESS TROUBLE YOU";:GOS.900
135 P."IS IT DIFFICULT FOR YOU TO TRUST ANYONE";:GOS.900

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```
140 G.800
200 Z=-1:H=0:B$=DO YOU
205 C.:IFJ=1G.265
210 C.:I."WOULD YOU LIKE A RUN DOWN ON YOUR ANSWERS ";A
220 IFA=1G.265
230 J=1:G.10
265 P.A.128,"PLEASE LEAVE NOW FOR THE NEXT PERSON.
266 P.:P.:P."THANK YOU. GOODBYE.
280 P.A.896,"NEXT PERSON PRESS CLEAR":S.(0,47)
290 IFP.(0,47)G.290
300 G.4
500 GOS.900:P.B$;" ";;RET.
700 H=H+1
701 IFA(H-1)=0T.705
702 A$=NO
703 G.709
705 A$=YES
709 P." ?":P.:P."QUESTION";H:P.
710 P."YOU GOT";A(H-1);"POINTS FOR YOUR ANSWER OF ";A$
711 G=G+A(H-1)
715 P.
720 P."BRINGING YOUR TALLY TO ";G
723 P.:P.
725 I."PRESS ENTER FOR THE NEXT QUESTION ";A$:C.
730 RET.
800 C.:IFZ=-1G.810
801 S=S*2
802 IFA>=0G.810
803 C.:P."APOLOGIES. THERE HAS BEEN A MALFUNCTION.":P.:P.
804 P."PLEASE RESTART.":P.:P.:A=0:G.3
810 P."YOUR MATURITY QUOTIENT SCORES A TOTAL OF";S;"POINTS.
811 P."YOUR MATURITY RATING THEREFORE, IS":
819 A$=A SCORE OF
820 P.A$;" 75 OR MORE IS SUPER.
825 P.A$;" 65 TO 74 IS EXCELLENT.
830 P.A$;" 55 TO 64 IS GOOD.
835 P.A$;" 45 TO 54 IS FAIR.
840 P.A$;" 35 TO 44 IS POOR.
845 P.
850 P."KEEP IN MIND THAT ONLY AFTER THE AGE OF 60 ARE YOU
860 P."LIKELY TO RATE SUPER. AGE IS NOT NECESSARY FOR
870 P."MATURITY, BUT THE MORE YEARS YOU LIVE, THE GREATER
871 P."IS YOUR OPPORTUNITY TO DEVELOP YOUR MATURITY SCORE.
872 P."IF YOU SCORE OVER 75 IN AN EARLIER STAGE OF LIFE -
873 P."(AND IF IT IS AN HONEST SCORE BASED ON GENUINE THOUGHT)
874 P."THEN TRULY YOUR MATURITY IS EXTRAORDINARY."
875 GOS.1000
879 IFS<75G.895
880 F.X=1T.20
881 P.A.100;" ";
882 F.Y=1T.100:N.Y
883 P.A.100:B$;
884 P.A.960;
885 F.Y=1T.100:N.Y
890 N.X
891 G.899
895 P.A.100:B$;
899 P.A.228;;I."<PRESS ENTER>";A$:G.200
900 IFZ<>-1G.902
901 GOS.700:RET.
902 P." ";;I.A(C):IFA(C)=1G.910
903 IFA(C)=0G.950
904 P.:P."I DO NOT UNDERSTAND YOU, PLEASE ANSWER AGAIN.
905 G.902
910 S=S+A(C)*F
911 A(C)=A(C)*F*2
920 C.
950 C.:C=C+1:P.A.512;;RET.
1000 IFS>74B$="SUPER":RET.
1005 IFS>64B$="EXCELLENT":RET.
1010 IFS>54B$="GOOD":RET.
1015 IFS>44B$="FAIR":RET.
1020 IFS>34B$="POOR":RET.
1025 B$="VERY LOW":RET.
```


CWORD (L2/4K)

BY L.G. RHEDEY 11

Crossword fans will love this program. It enables you to search a data bank of words to find (hopefully) that one that has eluded you. For example:- if in your crossword, you are searching for a missing word, (let's say the word is computer) and the only letters you have are C,U and E. then, RUN the program and type in -- C...U.E. entering a period (.) wherever a letter is unknown. The '80 will search the data statements for EVERY word that fits the pattern and display them. It is then up to you to select the correct word from those displayed. If no letters are known, type in the number of periods to match the length of the word, ie: will list all five letter words.

The strength of the program lies in the size of its data bank (lines 1000 - 26000). The listing includes a few words only for demonstration purposes, since you will certainly wish to set up your own data bank on a particular subject (T.V. crosswords for instance). Without data, this program requires only 500 bytes, leaving plenty of room even for 4K users.

The program operates by taking an input word (A\$) and comparing it with one read from data (B\$). If their length is not equal the next word from data is read. If their lengths are equal, the two words are compared letter for letter for a match. If the next letter of A\$ is a period, it is passed over. The process continues until the complete data bank has been searched. You might like to speed up operation by dividing the data bank into segments according to the length of the word for which you are searching. You could then alter the program logic so that it searches only the five letter word segment for five letter words, the six letter word segment for six letter words and so on.

```

10 REM ** CWORD BY L. G. RHEDEY **
20 REM ** 97 BRINGELLY RD.,      **
30 REM ** KINGSWOOD NSW 2750    **
40 REM ** 16/11/80              **
50 CLS
60 GOT080
70 CLS:RESTORE
80 PRINT"ENTER WORD TO BE SEARCHED FOR. TYPE . WHERE LETTER NOT KNOWN";
90 PRINT:PRINT:PRINT
100 INPUTA$
110 READB$
120 IFB$=" $"GOTO210
130 Z=LEN(A$):C=LEN(B$)
140 IFZ<>CGOTO110
150 FORX=1TOZ
160 IFMID$(A$,X,1)="."GOTO190
170 IFMID$(A$,X,1)=MID$(B$,X,1)THENGOTO190
180 GOTO110
190 NEXTX
200 PRINTB$,:GOTO110
210 PRINT:PRINT
220 PRINT"AGAIN (Y/N)";
230 I$=INKEY$:IFI$=" "GOTO230
240 IFI$="Y"GOTO70:ELSEEND
1000 DATAAPPLE,APE,ASK,ANOTHER,ACCEPT,ACCENT,AMPERE
2000 DATABUS,BUSINESS,BANK,BOAT,BAKE,BEAUTY,BUTTER
3000 DATACAKE,CANDLE,CUP,CALCULATOR,COMPUTER,COMPANY
4000 DATADOG,DUST,DISK,DATA,DIAGRAM,DIMENSION,DARK
5000 DATAELEPHANT,EAT,ENTER,ELECTRICITY,EXTENSION
6000 DATAFOG,FABLE,FEET,FIRE,FISH,FUNCTION,FAVOUR,FEEBLE
7000 DATAGOAT,GAMBLE,GAIN,GAME,GALLOWS,GUN,GUM,GAS
8000 DATAHELP,HINDER,HAPPY,HOSTAGE,HOME,HOUSE,HUNGER
9000 DATAINK,INVISIBLE,INFER,INEVITABLE,INDUSTRY
10000 DATAJUST,JUMBLE,JADE,JUNE,JUMBO,JAM,JIFFY
11000 DATAKEETLE,KNIFE,KNOT,KEEP,KEEN,KNEE,KNAVE,KNIGHT
12000 DATALEMON,LIME,LANGUAGE,LEVER,LOVE,LISTEN,LAKE
13000 DATAMINCE,MICE,MUSCLE,MUSIC,MUSTARD,MICRO
14000 DATANUMBER,NIMBLE,NEED,NEXT,NEAR,NOISE,NAVY
15000 DATAORANGE,ORGANISATION,ORACLE,ORDER,OPEN,OVEN
16000 DATAPURCHASE,PROGRAMME,PRIDE,PUP,PEST,POSITIVE
17000 DATAQUIET,QUAKE,QUIVER,QUIT,QUIRK,QUERY

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18000 DATARIVER,RAMPAGE,RUST,ROOSTER,RECEIVER,RESPECTABLE
19000 DATASEARCH,SIMPLE,SOW,SUMP,STANDING,SERVE,SHOCK
20000 DATATUMBLE,TEST,TEMPER,TRICK,TUG,TOUGH,TIMBER
21000 DATAUMBRELLA,UNCLE,UNDER,USELESS,UMPIRE,UNDRESS
22000 DATAVERIFY,VOCAL,VOICE,VOID,VIRILE,VANITY
23000 DATAWATER,WASTE,WONDER,WORK,WORRY,WAGE,WHISKY
24000 DATAXENON,XRAY,XYLOPHONE,XYLEM,XYLONITE
25000 DATAYACHT,YARD,YOODLE,YOUR,YANKEE,YESTERDAY,YELLOW
26000 DATAZIP,ZERO,ZOO,ZEAL,ZINC,ZENITH,ZOOM,ZYGOTE
30000 DATA$

```

AUTOMATIC CHESS BOARD (L2/16K)

BY G. THOMSON

This program fulfils the function of an "automatic" chess board. It presents a diagrammatic representation of a chess board on the screen, with the pieces set out correctly. Each player, in turn, enters a move which the program tests and if valid, registers by moving the corresponding pieces on the screen. The program knows most of the rules of chess and, to the author's knowledge, the only moves it will not accept are "En Passant" and "Castling". If an illegal move is entered, the program will wipe it and ask again. Moves are entered alternatively between white and black, with white having the first move.

If the board numbering is required to assist you in defining your move, hit..... "H" for help.
If these numbers are no longer required, hit..... "W" for wipe.

All pieces are formed from three graphic blocks joined in a string and are placed on the screen using PRINT's rather than POKE's or SET's, so the graphic display speed is no problem. The program takes 11000 bytes and therefore requires a machine of at least 16K. It was written on a SYSTEM 80 and considering the short amount of time for which Garry (16 years old) could have had his computer, he is to be congratulated.

```

0 CLS
10 PRINT @ 284,"CHESS";
20 PRINT @ 410,"WRITTEN BY"
30 PRINT @ 526,"GARRY THOMSON - 3 DELRAY ST. OAKLEY"
40 CLEAR (2000)
50 REM

```

```

CHESS BY GARRY THOMSON .....3 DELRAY ST. OAKLEY 4401

```

```

(076) 911703

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```

110 DEFINT I,N,A,B,C:DEFSTR S,P:DIM S(8,16),L$(15),P(8,8):BS$=CHR$(8):C$=CHR$(95)
)
150 FOR I=1 TO 12: READ A,B,C: L$(I)=CHR$(A)+CHR$(B)+CHR$(C):NEXT I
165 REM WHITE PIECES      =====      WHITE
170 DATA 171,140,151
180 DATA 162,188,140
190 DATA 136,191,132
200 DATA 138,188,133
210 DATA 185,179,182
220 DATA 160,191,144
230 REM BLACK PIECES     =====      BLACK
240 DATA 148,179,168
250 DATA 157,131,179
260 DATA 183,128,187
270 DATA 131,131,186
280 DATA 134,140,137
290 DATA 159,128,175
300 FOR I = 1 TO 12
310 ON I GOSUB 60000,60010,60020,60030,60040,60050,60060,60070, 60080,60090,601
00,60110
320 NEXT I
325 CLS:PRINT"THIS PROGRAM KNOWS THE RULES OF CHESS BUT DOES NOT
PLAY FOR ITSELF. IT REQUIRES THE PLAYERS TO ENTER THEIR MOVES
IN ORDER AS ONE COORDINATE FOLLOWED BY 'TO' THEN THE NEXT

```


EG... '1,7T01,6'

FOR NUMBERING OF THE BOARD*;

326 PRINT* HITH (FOR HELP)

TO REMOVE THE NUMBERS HITW (FOR WIPE)

HIT ANY KEY TO CONT*

327 Q\$=INKEY\$:IF Q\$="" THEN 327

330 FOR I=1 TO 8 STEP 2

340 FOR J=1 TO 16 STEP 4

345 S(I,J+2)=STRING\$(5,128): S(I,J+3)=STRING\$(5,128)

350 S(I,J)=STRING\$(5,191): S(I,J+1)=STRING\$(5,191)

353 S(I+1,J+2)=STRING\$(5,191): S(I+1,J+3)=STRING\$(5,191)

355 S(I+1,J)=STRING\$(5,128): S(I+1,J+1)=STRING\$(5,128)

360 NEXT J,I:CLS

372 INPUT " WHITE PLAYER ";N1\$

375 INPUT " BLACK PLAYER ";N2\$

380 FOR I= 16 TO 1 STEP -1

390 FOR J= 1 TO 8

400 PRINT S(J,I);

410 NEXT J

415 IF J>7 AND I<2 THEN 430

420 PRINT

430 NEXT I

432 GOTO 435

433 FOR A=1 TO 16 :PRINT STRING\$(64,191);:NEXT A

435 N=897

440 FOR I= 1 TO 8

450 FOR J= 1 TO 8

470 PRINT @ N,P(J,I);

475 U(J,I)=N

480 N=N+5

490 IF POS(0) > 35 THEN N=N-168

500 NEXT J,I

520 PRINT @ 45,"C H E S S";

522 PRINT @ 109,STRING\$(9,131);

525 F=(F=0):IF F=0 THEN Q\$=N2\$+"S MOVE- " ELSE Q\$=N1\$+"S MOVE- "

540 PRINT @ 233, STRING\$(23,128);:PRINT @ 297,STRING\$(22,128);:PRINT @ 233,Q\$;

541 PRINT @ 297,"- ";:E=0:W=0:B\$=""

550 A\$ = INKEY\$: IF A\$ = " " OR A\$="" THEN 550

555 IF A\$="H" GOTO 65000

556 IF A\$=B\$ IF LEN(B\$)>0 THEN B\$=LEFT\$(B\$,LEN(B\$)-1):PRINTB\$;A\$;C\$;:GOTO 550

:ELSE GOTO 550

557 IF A\$="W" GOTO 65050

558 IF LEN(B\$)>19 OR A\$=CHR\$(10) THEN 550

560 IF A\$ <> CHR\$(13) THEN PRINTB\$;A\$;C\$;: B\$=B\$+A\$:GOTO 550

565 PRINTB\$;

570 IF LEN(B\$) <> 8 THEN 540

580 IF MID\$(B\$,4,2) <> "TO" THEN 540

590 A=VAL(LEFT\$(B\$,1))

600 B=VAL(MID\$(B\$,3,1))

610 C=VAL(MID\$(B\$,6,1))

620 D=VAL(RIGHT\$(B\$,1))

622 IF A*B*C*D=0 THEN 540

623 IF A>8 OR B>8 OR C>8 OR D>8 THEN 540

625 IF A+B+C+D>32 THEN 540

630 FOR I=1 TO 12

640 IF P(A,B) = L\$(I) THEN 660

650 NEXT I

655 GOTO 540

660 IF F=0 AND I<7 THEN 540

670 IF F=-1 AND I>6 THEN 540

675 J=0

680 IF P(C,D)="" THEN 740

690 FOR J= 1 TO 12

700 IF P(C,D) = L\$(J) THEN 710

702 NEXT J

705 GOTO 540

710 IF F=0 AND J>6 THEN 540

720 IF F=-1 AND J<7 THEN 540

730 IF J=5 OR J=11 THEN W=1

740 ON I GOSUB 60200,60250,60300,60350,60400,60450,60200,60250,60300,60350,60400,60450


```

750 IF E=1 THEN 540
760 PRINT @ U(A,B)-1,S(A,B*2);
770 PRINT @ U(C,D),P(C,D);
780 IF W=1 THEN 800
790 GOTO 525
800 PRINT @ 745,"THE GAME IS OVER";
810 PRINT @ 810,"TO PLAY AGAIN HIT-A";
820 J$=INKEY$:IF J$<>"A" THEN 820
825 PRINT @ 875 , " I'LL PREPARE";
830 FOR I=1 TO 8:FOR J=1 TO 8
840 P(I,J)=" "
850 NEXTJ,I
860 GOTO 300
59998 REM THESE SUB ROUTINES ALLOCATE THE GRAPHIC SHAPES
59999 REM =====
60000 P(1,8)=L$(I):P(8,8)=L$(I)
60005 RETURN
60010 P(2,8)=L$(I):P(7,8)=L$(I)
60015 RETURN
60020 P(3,8)=L$(I):P(6,8)=L$(I)
60025 RETURN
60030 P(4,8)=L$(I)
60035 RETURN
60040 P(5,8)=L$(I)
60045 RETURN
60050 FOR N=1 TO 8 :P(N,7)=L$(I):NEXT N
60055 RETURN
60060 P(8,1)=L$(I):P(1,1)=L$(I)
60065 RETURN
60070 P(2,1)=L$(I):P(7,1)=L$(I)
60075 RETURN
60080 P(3,1)=L$(I):P(6,1)=L$(I)
60085 RETURN
60090 P(4,1)=L$(I)
60095 RETURN
60100 P(5,1)=L$(I)
60105 RETURN
60110 FOR N=1 TO 8 :P(N,2)=L$(I):NEXT N
60115 RETURN
60200 REM =====MOVING ROOKS
60205 IF A<>C AND B=D THEN G1=A:G2=C:GOTO 60221
60207 IF B<>D AND A=C THEN G1=B:G2=D:GOTO 60211
60209 E=1 : RETURN
60211 IF G1<G2 THEN S!=1 ELSE S!=-1
60213 FOR G=G1 TO G2 STEP S!
60214 G3=(G<>G1)AND (G<>G2)
60215 IF P(A,G)<>" " AND G3=-1 THEN E=1:RETURN
60217 NEXT G
60219 GOTO 60229
60221 IF G1<G2 THEN S!=1 ELSE S!=-1
60223 FOR G=G1 TO G2 STEP S!
60224 G3=(G<>G1)AND (G<>G2)
60225 IF P(G,B)<>" " AND G3=-1 THEN E=1:RETURN
60227 NEXT G
60229 P(C,D)= P(A,B)
60231 P(A,B)= " "
60233 RETURN
60250 REM =====MOVING KNIGHTS
60255 IF ((A-C)[2+(B-D)[2]<>5 THEN E=1 : RETURN
60260 P(C,D)=P(A,B)
60265 P(A,B)=" "
60270 RETURN
60300 REM =====MOVING BISHOPS
60305 IF INT(ABS(ABS(A-C)-ABS(B-D)))<>0 THEN E=1 : RETURN
60310 IF A<C THEN G1=A :G2=C :G3=B :GOTO 60327
60315 G1=C:G2=A : G3=D
60320 IF B>D THEN S!=1:GOTO 60330
60325 S!=-1:GOTO 60330
60327 IF B<D THEN S!=1:GOTO 60330
60329 S!=-1
60330 FOR G= G1 TO G2
60335 G4=(G<>G1)AND (G<>G2)
60340 IF P(G,G3)<>" " AND G4=-1 THEN E=1:RETURN
60342 G3=G3+S!

```


DON'T BE HELD BACK BY AN ANTIQUATED DISK OPERATING SYSTEM

MOVE UP TO

NEWDOS 80 \$149 incl. p&p

NEWDOS 80 is a completely new DOS for the TRS-80 SYSTEM 80. It is well-documented, bug free and increases the power of your system many times over. It is upward compatible with TRSDOS AND NEWDOS (ie TRSDOS and NEWDOS+ programs will run on NEWDOS 80 but the reverse is not necessarily so).

These are just a few of the many new features offered by NEWDOS 80.

- * New BASIC commands that support variable record lengths up to 4095 bytes long.
- * Mix or match disk drives. Supports any track count from 18 to 96. Use 35, 40, 77 or 80 track 5¼ inch mini disk drives, 8 inch disk drives OR ANY COMBINATION.
- * An optional security boot-up for BASIC or machine code application programs. User never sees "DOS-READY" or "READY" and is unable to "BREAK", clear screen or issue any direct BASIC statements, including "LIST".
- * New editing commands that allow program lines to be deleted from one location and moved to another or to allow the duplication of a program line with the deletion of the original.
- * Enhanced and improved RENUMBER that allows relocation of subroutines.
- * Create powerful chain command files which will control the operation of your system.
- * Device handling for routing to display and printer simultaneously.
- * MINIDOS — striking the D, F and G keys simultaneously calls up a MINIDOS which allows you to perform many of the DOS commands without disturbing the resident program.
- * Includes Superzap 3.0 which enables you to display/print/modify any byte in memory or on disk.
- * Also includes the following utilities:
 - Disk Editor/Assembler
 - Disassembler (Z80 machine code)
 - LM offset — allows transfers of any system tape to Disk file — automatically relocated.
 - LEVEL 1 — Lets you convert your computer back to Level 1.
 - LVIDKSL — Saves and loads Level 1 programs to disk.
 - DIRCHECK — Tests disk directories for errors and lists them.
 - ASPOOL — An automatic spooler which routes a disk file to the printer whilst the computer continues to operate on other programs.
 - LCDVR — a lower case drives which display lower case on the screen if you have fitted a simple lower case modification.

DISK DRIVE USERS ELIMINATE CRC ERRORS AND

TRACK LOCKED OUT MESSAGES FIT A PERCOM DATA SEPARATOR

\$37.00 plus \$1.20 p&p.

When Tandy designed the TRS-80 expansion interface, they did not include a data separator in the disk-controller circuitry, despite the I.C. manufacturer's recommendations to do so. The result is that many disk drive owners suffer a lot of Disk I/O errors. The answer is a data separator. This unit fits inside your expansion interface. It is supplied with full instructions and is a must for the serious disk user.

MPI DISK DRIVES

HIGHER PERFORMANCE — LOWER PRICE

MPI is the second largest manufacturer of disk drives in the world. MPI drives use the same form of head control as 8" drives and consequently, they have the fastest track-to-track access time available — 5msec! All MPI drives are capable of single or double-density operation. Double-density operation requires the installation of a PERCOM doubler board in the expansion interface.

As well as single head drives, MPI also makes dual-head drives. A dual-head drive is almost as versatile as two single-head drives but is much cheaper.

Our MPI drives are supplied bare or in a metal cabinet — set up to operate with your TRS-80 or SYSTEM 80. All drives are sold with a 90 day warranty and service is available through MICRO-80 PRODUCTS.

MPI B51 40 Track Single Head Drive. only \$339
MPI B52 40 Track Double Head Drive. only \$449

Prices are for bare drives and include p&p. Add \$10.00 per drive for a cabinet and \$60.00 for a power supply to suit two drives. 40 track drives are entirely compatible with 35 track drives. A 40 track DOS such as NEWDOS 80 is necessary to utilise the extra 5 tracks.

OVER 800 KILOBYTES ON ONE DISKETTE! WITH MPI 80 TRACK DRIVES

MPI 80 track drives are now available. The B91 80 track single-head drive stores 204 Kilobytes of formatted data on one side of a 5¼ inch diskette in single-density mode. In double-density mode it stores 408 Kilobytes and loads/saves data twice as quickly.

The B92 80 track dual-head drive stores 204 Kilobytes of formatted data on EACH side of a 5¼ inch diskette in single-density mode. That's 408 Kilobytes per diskette. In double-density mode, the B92 stores a mammoth 408 Kilobytes per side or 816 Kilobytes of formatted data per diskette. With two B92's and a PERCOM double, you could have over 1.6 Megabytes of on line storage for your TRS-80 for less than \$1500!!

MPI B91 80 Track Single Head Drive. only \$499
MPI B92 80 Track Dual Head Drive only \$599

Prices are for bare drives and include p&p. Add \$10.00 per drive for a cabinet and \$60.00 for a power supply to suit two drives. Note: 80 track drives will not read diskettes written on a 35 or 40 track drive. If drives with different track counts are to be operated on the same system, NEWDOS 80 must be used.

CARE FOR YOUR DISK DRIVES? THEN USE

3M's DISK DRIVE HEAD CLEANING DISKETTES \$30.20 incl. p&p.

Disk drives are expensive and so are diskettes. As with any magnetic recording device, a disk drive works better and lasts longer if the head is cleaned regularly. In the past, the problem has been, how do you clean the head without pulling the mechanism apart and running the risk of damaging delicate parts. 3M's have come to our rescue with SCOTCH BRAND, non-abrasive, head cleaning diskettes which thoroughly clean the head in seconds. The cleaning action is less abrasive than an ordinary diskette and no residue is left behind. Each kit contains:

- 2 head cleaning diskettes
- 1 bottle of cleaning fluid
- 1 bottle dispenser cap

MICROPOLIS 77 TRACK DISK DRIVES

These fabulous MICROPOLIS disk drives have more than double the storage capacity of the standard 35 track drives.

DD-7S only \$775 incl. p&p

77 track MICROPOLIS drive complete with cable for four drives, power supply, chassis and includes NEWDOS 80.

DD-7 only \$649 incl. p&p

Same as above but no cable or NEWDOS 80.

DC-4 only \$45 incl. p&p

4 drive connector cable — suitable for any disk drives.

**FLOPPY DOCTOR AND MEMORY DIAGNOSTIC
(by MICRO CLINIC) \$29.95 plus 50c. p&p**

Two machine language programs on a diskette together with manual which thoroughly test your disk drives and memory. There are 19 possible error messages in the disk drive test and their likely causes are explained in the manual. Each pass of the memory tests checks every address in RAM 520 times, including the space normally occupied by the diagnostic program itself. When an error occurs the address, expected data, and actual data are printed out together with a detailed error analysis showing the failing bit or bits, the corresponding IC's and their location. This is the most thorough test routine available for TRS-80 disk users.

PROGRAMS BY MICROSOFT**EDITOR ASSEMBLER PLUS (L2/16K)**

\$37.50 + \$1.20 p&p

A much improved editor-assembler and debug/monitor for L2/16K TRS-80 or SYSTEM 80. Assembles directly into memory, supports macros and conditional assembly, includes new commands-substitute, move, copy and extend.

LEVEL III BASIC \$59.95 plus \$1.20 p&p

Loads on top of Level II BASIC and gives advanced graphics, automatic renumbering, single stroke instructions (shift-key entries) keyboard debounce, suitable for L2/16K and up (Not Disk BASIC)

ADVENTURE ON DISK \$35.95 plus \$1.20 p&p

This is the original ADVENTURE game adapted for the TRS-80. The game fills an entire diskette. Endless variety and challenge as you seek to rise to the level of Grand Master. Until you gain skill, there are whole areas of the cave that you cannot enter. (Requires 32K One Disk)

BASIC COMPILER \$208 plus \$2.00 p&p

New improved version, the Basic Compiler converts Disk BASIC programs to machine code, automatically. A compiled program runs, on average, 3-10 times faster than the original BASIC program and is much more difficult to pirate.

GREEN SCREEN SIMULATOR

\$19.95 incl. p&p

The GREEN SCREEN SIMULATOR is made from a deep green perspex, cut to fit your monitor. It improves contrast and is much more restful to the eyes than the normal grey and white image.

All editorial staff of MICRO-80 are now using GREEN SCREEN SIMULATORS on their own monitors.

Please make sure to specify whether you have an old (squarish) or new (rounded) style monitor when ordering. Not available for Dick Smith monitors.

**UPGRADE TO 16K
FOR ONLY \$30.00!!****MICRO-80's 16K MEMORY EXPANSION KIT
HAS BEEN REDUCED IN PRICE EVEN MORE**

Larger volume means we buy better and we pass the savings on to you. These are our proven, prime, branded 200 ns (yes, 200 nanosecond) chips. You will pay much more elsewhere for slow, 350 ns. chips. Ours are guaranteed for 12 months. A pair of DIP shunts is also required to upgrade the CPU memory in the TRS-80 — these cost an additional \$4.00. All kits come complete with full, step-by-step instructions which include labelled photographs. No soldering is required. You do not have to be an experienced electronic technician to instal them.

**USE TANDY PERIPHERALS ON YOUR SYSTEM-80
VIA****SYSPAND-80 — \$119 incl. p&p**

The SYSTEM-80 hardware is not compatible with the TRS-80 in two important areas. The printer port is addressed differently and the expansion bus is entirely different. This means that SYSTEM-80 owners are denied the wealth of economical, high performance peripherals which have been developed for the TRS-80. Until now, that is. MICRO-80 has developed the SYSPAND-80 adaptor to overcome this problem. A completely self-contained unit in a small cabinet which matches the colour scheme of your computer, it connects to the 50-way expansion part on the rear of your SYSTEM 80 and generates the FULL Tandy 40 way bus as well as providing a Centronics parallel printer port. SYSPAND-80 enables you to run an Exatron Stringy Floppy from your SYSTEM 80, or an LNW Research expansion interface or a MICROTEK memory expansion module or any other desirable peripherals designed to interface to the TRS-80 expansion port. Make your SYSTEM 80 hardware compatible with the TRS-80 via SYSPAND-80.

UPGRADE TO A 48K SYSTEM FOR ONLY \$245!!**VIA THE
MICROTEK MEMORY EXPANSION/PRINTER
MODULE**

Need more memory but don't want to pay over \$600 for an expansion interface? Then the MICROTEK MT-32 memory expansion/printer module is for you. Ready to plug in and go, this module provides you with sockets for an extra 32K of ram in 16K blocks plus a printer port. It is housed in an attractive, grey and black metal cabinet of similar size to the Tandy expansion interface so that you can sit your monitor atop it. The MICROTEK unit runs from the same external power pack as the Tandy CPU. The Centronics parallel printer port enables you to run most printers including the Olivetti ET-121 with MICRO-80 interface. Full instructions for connecting to your system and adding memory chips are included.

SYSTEM 80 owners can use the MICROTEK module via the SYSPAND-80 adaptor. A separate external power supply providing 7.5—0—7.5 volt ac at 0.5 amp plus 20v unfiltered dc at 250 ma is required. (not available at present from MICRO-80 PRODUCTS)

MICROTEK MT32-A	0K	\$149
MICROTEK MT32-B	16K	\$179
MICROTEK MT32-C	32K	\$209

HIGH QUALITY DISKETTES ALL PRICES INCLUDE P&P

40 TRACK NASHUA SINGLE SIDE/SINGLE DENSITY ... \$45.00 box of 10

HIGH QUALITY

40 TRACK VERBATIM DOUBLE SIDE

SOFTWARE BY AUSTRALIAN AUTHORS

All our software is suitable for either the **SYSTEM 80** or the **TRS-80**

NEW SOFTWARE FROM MICRO-80 PRODUCTS

BUSINESS PROGRAMS

MICROMANAGEMENT

STOCK RECORDING SYSTEM (L2/16K)

Cassette version. \$29.95 + \$1.00 p&p
Stringy Floppy version. \$33.95 + \$1.00 p&p

This system has been in use for 9 months in a number of small retail businesses in Adelaide. It is therefore thoroughly debugged and has been tailor made to suit the requirements of a small business. MICROMANAGEMENT SRC enables you to monitor the current stock level and reorder levels of 500 different stock items per tape or wafer. It includes the following features:—

- Add new items to inventory
- Delete discontinued items from inventory
- List complete file
- Search for any stock number
- Save data to cassette or wafer
- Load data from cassette or wafer
- Adjusts stock levels from sales results and receipt of goods
- List all items requiring reordering

We can thoroughly recommend this program for the small business with a L2/16K computer.

SCOTCH BRAND COMPUTING CASSETTES

Super-quality personal computing cassettes.

C-10 pack of 10 \$26.00 incl. p&p
C-30 pack of 10 \$28.00 incl. p&p

UTILITIES

S-KEY by Edwin Paay **\$15.95 plus 50c. p&p**

S-KEY is a complete keyboard driver routine for the TRS-80 and becomes part of the Level II basic interpreter. With S-KEY loaded the user will have many new features not available with the standard machine.

S-KEY features:

- * S-KEY provides an auto-repeat for all the keys on the keyboard. If any key is held down longer than about half a second, the key will repeat until it is released.
- * Graphic symbols can be typed direct from the keyboard, this includes all 64 graphic symbols available from the TRS-80/SYSTEM 80.
- * S-KEY allows text, BASIC commands and/or graphics to be defined to shifted keys. This makes programming much easier as whole commands and statements can be recalled by typing shift and a letter key.
- * Because S-KEY allows graphics to be typed directly from the keyboard, animation and fast graphics are easily implemented by typing the appropriate graphics symbols directly into PRINT statements.
- * S-KEY allows the user to LIST a program with PRINT statements containing graphics, properly. S-KEY does this by intercepting the LIST routine when necessary.
- * S-KEY allows the user to list an updated list of the shift key entries to the video display or line printer.
- * S-KEY can be disabled and enabled when required. This allows other routines which take control of the keyboard to run with S-KEY as well.

Each cassette has TRS-80, DISK and SYSTEM 80 versions and comes with comprehensive documentation.

BMON by Edwin Paay **\$19.95 plus 50c. p&p**
THE ULTIMATE HIGH MEMORY BASIC MONITOR L2/16-48K

Our own personnel refuse to write BASIC without first loading this amazing machine language utility program into high memory! BMON Renumbers; Displays BASIC programs on the screen while they are still loading; tells you the memory locations of the program just loaded; lets you stop a load part-way through; merges two programs, with automatic renumbering of the second so as to prevent any clashes of line numbers; recovers your program even though you did type NEW: makes one program invisible while you work on a second (saves hours of cassette time!); lists all the variables used in the program; makes SYSTEM tapes; lets you Edit memory directly . . . the list goes on and on. Cassette comes with 16K, 32K and 48K versions, ready to load. Can anyone afford NOT to have BMON?

EDUCATIONAL

RPN CALCULATOR (L2/16K & 32K)

\$24.95 \$ 50c. p&p

Give your computer the power of a \$650 reverse polish notation calculator with 45 functions and selectable accuracy of 8 or 16 digits. The main stack and registers are continuously displayed whilst the menu is always instantly accessible without disturbing any calculations or register values. The cassette comes with both the 16K and 32K versions, the latter giving you the additional power of a programmable calculator. Comes with a very comprehensive 15 page manual, which includes instructions to load and modify the 32K programmable version to run in 16K. Whether for business or pleasure, this package will prove invaluable, and turn you '80 into a very powerful instrument.

GAMES

MICROPOLY (L2/16K)

\$7.50 \$ 50c p&p

Now you can play Monopoly on your micro. The old favourite board game has moved into the electronic era. This computer version displays the board on the screen, obeys all the rules and, best of all, the banker does not make mistakes with your change!

CONCENTRATION (L2/16K)

\$7.50 + 50c p&p

Another application of supergraphics. There are 28 "cards" displayed on the screen, face down. Players take it in turn to turn them over with the object of finding matching pairs. There are 40 different patterns which are chosen at random, so the game is full of endless variety. This is of particular value in helping young children to learn the art of concentrating and, at the same time, to introduce them to the computer.

METEOR AND TORPEDO ALLEY (L2/16K)

\$9.95 + 50c p&p

Those who frequent games arcades will recognize these two electronic games. In METEOR you must destroy the enemy space ships before they see you. In its most difficult mode, the odds are a thumping 238 to 1 against you being successful. In torpedo alley you must sink the enemy ships without hitting your own supply ship. Both games include sound effects and are remarkably accurate reproductions of the arcade games.

AUSTRALIAN SOFTWARE (Cont.)**TOUCHTYPE (L2/4K) \$19.95 + 50c. p&p**

An interactive, 22 lesson typing course which uses the computer's keyboard and screen to teach you to type rapidly and accurately and, a massive cassette data dump to control your progress. The computer checks for accuracy, and sets timed exercises to check your progress. If you have to look at each key before you press it, or only use two fingers, then this program, plus a little perseverance, will do some amazing things to your typing speed.

GAMES**U BOAT \$7.50 plus 50c p&p**

Real time simulation at its best! Comes with working sonar-screen and periscope, a full rack of torpedoes, plenty of targets, working fuel and battery meters, helpful Mothership for high-seas reprovisioning and even has emergency radio for that terrible moment when the depth charges put your crew at risk. Requires Level II/16K.

SPACE INVADERS \$7.50 plus 50c p&p

Much improved version of this arcade favourite with redesigned laser and cannon blasts, high-speed cannon, 50 roving drone targets, 10 motherships and heaps of fun for all. Level II with 4K and 16K versions on this cassette.

GOLF (L2/16K) \$7.50 + 50c p&p

Pit your skills at mini-golf against the computer. Choose the level of difficulty, the number of holes and whether you want to play straight mini golf or crazy golf. Complete with hazards, water traps, bunkers and trees. Great fun for kids of all ages.

DOMINOES (L2/16K) \$7.50 + 50c p&p

Pit your skill at dominoes against the computer, which provides a tireless opponent. Another application of supergraphics from the stable of Charlie Bartlett. Dominoes are shown approximately life size in full detail (except for colour!). The monitor screen is a window which you can move from one end of the string of dominoes to the other. Best of all, you don't lose any pieces between games!

KID'S STUFF (formerly MMM-1) \$7.50 plus 50c. p&p

Three games on one cassette from that master of TRS-80 graphics, Charlie Bartlett. Includes INDY 500, an exciting road race that gets faster and faster the longer you play, SUBHUNT in which your warship blows up unfortunate little submarines all over the place, and KNEVEL (as in motorcycle, ramp and buses).

OTHER PROGRAMS**INFINITE BASIC BY RACET (32K/1 DISK)**

\$49.95 + 50c. p&p

Full matrix functions — 30 BASIC commands; 50 more STRING functions as BASIC commands.

GSF/L2/48K \$24.95 + 50c. p&p

18 machine language routines including RACET sorts.

BUSINESS ADDRESS AND INFORMATION SYSTEM (48K/DISK) \$24.95 + 50c. p&p

Allows you to store addresses and information about businesses, edit them and print them out.

HISPED (L2 16, 32 or 48K) \$29.95

This machine language program allows you to SAVE and LOAD programs and data to tape at speeds up to 2000 band (4 times normal) using a standard cassette recorder. A switch must be installed to remove the XRX III loading board, if fitted.

PROGRAMS FROM CREATIVE COMPUTING**ADVENTURE PROGRAMS****ADVENTURELAND (L2/16K) \$14.95 + 50c. p&p**

Try to find and take treasures as you explore a fantasy world. The computer acts as your puppet and carries out your two word commands.

Sometimes you will need special objects to do certain things, often a little magic is necessary. Absorbing and challenging.

THE COUNT ADVENTURE (L2/16K)

\$14.95 + 50c. p&p

In this adventure, you awaken in a bed in a castle in Transylvania. You don't know why you are there but you'd better solve the puzzle before it's too late. Just as enthralling as ADVENTURELAND but blood thirstier!

ADVENTURELAND AND PIRATE ADVENTURE ON DISK (32K ONE DISK) \$24.95 + 50c. p&p

This is the Adventureland program on disk plus Pirate Adventure, complete with buried treasure, keel hauling, planks for walking and skulls and crossbones.

You can save the game to disk at any point and return to it later when your nerves are steady.

GAMES**AIR TRAFFIC CONTROLLER (L2/16K)**

\$9.95 + 50c. p&p

One of the hottest selling games in the USA, you are the Air Traffic Controller and the monitor is your radar screen. Bring down the aircraft safely and avoid mid-air collisions.

Z CHESS (L2/16K) \$19.95 + 50c. p&p

(DISK/32K) \$24.95 + 50c. p&p

Seven levels of ability, contains all standard moves including castling and En Passant captures. It can play either black or white and its versatile board set-up mode allows specific positions to be played as desired.

SPACE GAMES (L2/16K) \$13.50 + 50c. p&p

3 Space Games including ULTRA-TREK, ROMULAN, and STARWARS. Fast, real-time graphics.

STRATEGY GAMES (L2/16K) \$9.50 + 50c. p&p

5 Strategy games including TUNNEL VISION (find your way out of a 3-D maze), EVASION — avoid the deadly snake), JIGSAW (put the puzzle together), THE MASTERS (Golf on the '80 for up to 4 players), MOTOR RACING (Compete against the computer at Indy or the Grand Prix).

GRAPHING PACKAGE (L2/16K) \$9.95 + 50c. p&p

A set of 6 utility programs which allow you to draw BAR GRAPHS, GRAPH CARTESIAN COORDINATES, carry out POLAR GRAPHING, PARAMETRIC GRAPHING, LINEAR REGRESSION and PARABOLIC REGRESSION.

BOOKS**LEVEL II ROM REFERENCE MANUAL**

\$24.95 + \$1.20 p&p

Over 70 pages packed full of useful information and sample programs. Applies to both TRS-80 and SYSTEM 80.

TRS-80 DISK AND OTHER MYSTERIES

\$24.95 \$1.20 p&p

The hottest selling TRS-80 book in the U.S.A. Disk file structures revealed, DOS's compared and explained, how to recover lost files, how to rebuild crashed directories — this is a must for the serious Disk user and is a perfect companion to any of the NEWDOS's.


```

60344 NEXT G
60345 P(C,D)= P(A,B)
60346 P(A,B)="": RETURN
60350 REM =====MOVING QUEENS
60355 IF A<>C AND B<>D THEN GOSUB 60300 : RETURN
60360 IF A=C OR B=D THEN GOSUB 60200 : RETURN
60365 E=1
60370 RETURN
60400 REM =====MOVING KINGS
60405 IF ABS(A-C)>1 OR ABS(B-D)>1 THEN E=1 : RETURN
60410 IF A<>C AND B<>D THEN GOSUB 60300 : RETURN
60415 IF A=C OR B=D THEN GOSUB 60200 : RETURN
60420 E=1:RETURN
60450 REM =====MOVING PAWNS
60460 Y=0
60465 IF I=6 AND B=7 AND (B-D)>0 THEN Y=1
60470 IF I=12 AND B=2 AND (D-B)>0 THEN Y=2
60480 L=ABS(B-D)
60485 IF L=2 AND Y<1 THEN E=1:RETURN
60490 IF (B-D)<0 AND I=6 THEN E=1 : RETURN
60495 IF (D-B)<0 AND I=12 THEN E=1 : RETURN
60497 IF J>0 THEN 60550
60498 IF A<>C THEN E=1 : RETURN
60500 IF P(C,D)<>" THEN E=1 : RETURN
60505 IF L=2 AND P(A,D-1)<>" AND Y=2 THEN E=1 : RETURN
60510 IF L=2 AND P(A,D+1)<>" AND Y=1 THEN E=1 : RETURN
60515 GOTO 60700
60550 IF ABS(A-C)>1 THEN E=1 : RETURN
60555 IF ABS(B-D)>1 THEN E=1 : RETURN
60560 IF P(C,D)=" THEN E=1: RETURN
60700 IF D=1 OR D=8 THEN P(C,D)=L$(I-2)ELSE P(C,D)=P(A,B)
60710 P(A,B)="
60720 RETURN
65000 REM HELP BOARD NUMBERING
65005 FOR I= 1TO 8:FOR J= 1 TO8
65007 H$=RIGHT$(STR$(I*10+J),2):H$=LEFT$(H$,1)+", "+RIGHT$(H$,1)
65010 PRINT @ V(I,J)+64,H$;
65020 NEXT J,I
65030 GOTO 540
65050 FOR I=1 TO 8 : FOR J= 1TO 8
65060 PRINT @ V(I,J)+63,S(I,J*2-1);
65070 NEXT J,I: GOTO 540

```

CELLAR CONTROL (L2/16K)

BY M.J. LEONARD

This is an inventory control and selection guide for up to 200 different wines with a maximum of 99 bottles of each. Which means it could keep control of a cellar containing 19,800 bottles! (hic! - Ed.). Selection can be made from three fields namely:

- Vintage year
- Vineyard (or Maker)
- Grape Variety or Type

Display of the selected field is given on the VDU, panel by panel. Upon making your choice(s), returning to the menu allows adjustment of the stock and automatic reduction of the inventory. The updated file is then returned to tape. As data is packed, it takes only six and a half minutes to save or load 200 entries.

This program is an interesting exercise in character string manipulation, which could be adapted for cataloguing and control of many other hobbies... records, beer mats, books and plants to name a few. The only care that must be taken is that once headings have been created, all entries to and selection from the individual items, (strings) must be of the specified field length, e.g. number of bottles must always contain 3 digits, otherwise the computer will get lost. Each entry should look like this:-

NO	YEAR	VINEYARD	BIN/TYPE	VARIETY	BGT	PRICE	BIN
003	1965	Rosemount	Bin 25A	Cab.Shiraz	'80	4.25	14

Only the number of bottles and three of the fields (Or headings) are called up in the program, therefore you are free to change or enter anything under the other headings or even add another category such as Bin Number for example, if you want to know which wines are in a particular Bin. Instructions are given throughout the program, "NEWLINE" showing that it was created on a System 80 (TRS-80 users press "ENTER" instead of "NEWLINE").

```

5 '          CELLAR CONTROL
6 ' AUTHOR - M. J. LEONARD, 3 PROSPECT AVE., CREMORNE, 2090
10 CLS: CLEAR11500: DEF STRA: DEF INTI, J, T, X: DIMA(201): PRINT@23, "CELLAR CONTROL": PRIN
T@87, STRING$(14, 42): PRINT "FOR CONTROL AND ORGANISATION OF UP TO 200 DIFFERENT WI
NES"
15 PRINT: PRINT "# 1. KEYBOARD INPUT", "# 5. ADJUST STOCK": PRINT
20 PRINT "# 2. CASSETTE INPUT", "# 6. SELECT VINTAGE": PRINT
25 PRINT "# 3. SAVE ON CASSETTE", "# 7. SELECT VARIETY": PRINT
30 PRINT "# 4. CELLAR LIST", "# 8. SELECT VINEYARD": PRINT
35 INPUT "SELECTION #"; X$: X = VAL(X$): IF X = 0 OR X > 8 THEN GOTO 35 ELSE ON X GOTO 40, 80, 135, 94, 110, 1
55, 170, 180
40 CLS: PRINT "KEYBOARD INPUT": PRINT: PRINT "- ENTRY OF VINTAGE YEAR COMMENCES UNDER
'Y' ": PRINT "- ENTRY OF BOTH VINEYARD AND GRAPE VARIETY COMMENCES UNDER 'U'      AN
D CONSISTS OF LESS THAN 12 LETTERS": PRINT "- BGT = YEAR PURCHASED; BIN = STORAGE
BIN"
41 PRINT "- NO = NUMBER OF BOTTLES; ENTER THREE DIGITS E.G. 001": PRINT: PRINT "TO
RETURN TO SELECTION, OR CORRECT ERROR, TYPE 'EXIT' "
42 PRINT: PRINT "    NO YEAR VINEYARD    BIN/TYPE VARIETY    BGT PRICE BIN"
43 FOR I = 1 TO 200
45 IF A(I) < > "" THEN 70
50 A = "": INPUT A: IF LEN(A) > 57 THEN 65
55 IF A = "EXIT" THEN I = I - 1: GOTO 75
60 GOTO 68
65 PRINT "ERROR...ENTRY EXCEEDS MAXIMUM LENGTH": GOTO 50
68 A(I) = " " + A
70 NEXT I
75 CLS: PRINT "END OF INPUT...LIST CONTAINS"; I; " WINES": GOTO 15
80 CLS: PRINT "INPUT FROM CASSETTE": PRINT
85 INPUT "PREPARE CASSETTE RECORDER...PRESS -NEWLINE- WHEN READY"; X$: PRINT: PRINT "
LIST NOW BEING ENTERED FROM TAPE...PLEASE WAIT"
86 FOR I = 1 TO 200 STEP 4
87 INPUT # -1, A(I), A(I+1), A(I+2), A(I+3)
88 IF A(I) = "" OR A(I+1) = "" OR A(I+2) = "" OR A(I+3) = "" THEN 90
89 NEXT I
90 CLS: PRINT "INPUT FROM CASSETTE COMPLETED": GOTO 15
94 CLS: PRINT "COUNTING STOCK...PLEASE WAIT"
95 V = 0: FOR I = 1 TO 200: V = V + VAL(MID$(A(I), 2, 3)): NEXT I: CLS: PRINT "CELLAR LIST", "TOTAL
STOCK"; V; " BOTTLES"
98 FOR I = 1 TO 200
99 PRINT I; : PRINT A(I): PRINT: IF A(I) = "" THEN 105
100 IF INT(I/7) = I/7 THEN PRINT "PRESS -NEWLINE- FOR NEXT PANEL"; : INPUT X$: PRINT
101 NEXT I
105 PRINT "CELLAR LIST COMPLETE": INPUT "PRESS -NEWLINE- TO RETURN TO SELECTION"; X:
CLS: GOTO 15
110 CLS: PRINT "STOCK ADJUSTMENT": PRINT: PRINT "NIL STOCK AUTOMATICALLY REMOVES WINE
FROM LIST": PRINT: INPUT "WHICH LINE NO. IS REQUIRED"; I
112 PRINT: PRINT "LINE TO BE ADJUSTED :-": PRINT A(I): PRINT: INPUT "WHAT IS ADJUSTMENT
"; J: IF J > 99 THEN 112
115 JI = VAL(MID$(A(I), 3)) + J
120 IF JI = 0 THEN 130
121 IF JI > 9 THEN 125
124 A(I) = " " + STR$(JI) + MID$(A(I), 4, 54): CLS: GOTO 15
125 A(I) = " " + STR$(JI) + MID$(A(I), 4, 54): CLS: GOTO 15
130 FOR I = 1 TO 200
131 A(I) = A(I+1)
132 NEXT I
133 CLS: GOTO 15
135 CLS: PRINT "SAVING ON CASSETTE": PRINT: INPUT "PREPARE CASSETTE RECORDER...PRESS
-NEWLINE- WHEN READY"; X: PRINT: PRINT "LIST NOW BEING RECORDED ON TAPE...PLEASE WAI
T"
140 FOR I = 1 TO 200 STEP 4
142 PRINT # -1, A(I), A(I+1), A(I+2), A(I+3)
145 IF A(I) = "" OR A(I+1) = "" OR A(I+2) = "" OR A(I+3) = "" THEN 150
147 NEXT I

```



```

150 CLS:PRINT"RECORDING COMPLETED":GOTO15
155 CLS:PRINT"SELECT VINTAGE":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
156 INPUT"WHAT VINTAGE IS REQUIRED";X:IFX<19000RX>2000THEN156
159 FORI=1TOII
160 J=VAL(MID$(A(I),7,4)):IFX=JTHEN165
162 GOTO166
165 PRINTI;:PRINTA(I):C=C+1:IFINT(C/15)=C/15THENPRINT"PRESS -NEWLINE- FOR NEXT P
ANEL";:INPUTX$
166 NEXTI
168 PRINT"LIST COMPLETE":PRINT"PRESS -NEWLINE- TO RETURN TO SELECTION";:INPUTX$:
CLS:GOTO15
170 CLS:PRINT"SELECT VARIETY":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
171 INPUT"WHAT GRAPE VARIETY IS REQUIRED (11 SPACES)";G$:IFLEN(G$)<>11THENPRINT:
PRINT"ERROR...SELECTION MUST CONSIST OF 11 LETTERS AND/OR SPACES":PRINT:GOTO171
174 FORI=1TOII
175 S$=MID$(A(I),34,11):IFG$=S$THEN165
176 GOTO166
180 CLS:PRINT"SELECT VINEYARD":PRINT:INPUT"TOTAL NO. OF WINES LISTED";II:PRINT
181 INPUT"WHAT VINEYARD IS REQUIRED (11 SPACES)";Y$:IFLEN(Y$)<>11THENPRINT:PRINT
"ERROR...SELECTION MUST CONSIST OF 11 LETTERS AND/OR SPACES":PRINT:GOTO181
184 FORI=1TOII
185 T$=MID$(A(I),12,11):IFY$=T$THEN165
186 GOTO166

```

LIFE AT 7000HLIFE AT 7000H***LIFE AT 7000H***LIFE AT 7000H*
 ADAPTED BY N. ROSSITER BASIC and m/l (L2/1K)

Yes it is, your eyes don't deceive you. After waiting twelve months for someone to relocate Life to run at 7000H we eventually received it. If you still have the original BASIC part of the program on tape there is a small change that you will have to edit into it. If you are typing in the listing from the magazine (or you have a cassette subscription) you will not need to worry as the changes have been made for you. System 80/Video Genie/PMC 80 owners should type in the BASIC listing from this month's magazine and not the listing in the January 1980 issue as the 1980 version will not work on your machines. For those that were not subscribers at the time, the original text (changed where necessary) is reproduced below.

This program is in two parts, a machine language sub-routine which carries out most of the computations and a BASIC program used to set up initial parameters. The BASIC program calls the machine language program via the USR command.

The machine language program should be entered first using either an editor/assembler or a suitable monitor such as T-BUG (BMON is not suitable because it resides in the same area of memory as this program. You could use BMON by locating the program at a lower position in memory and adding a block-move routine as described in Issue 10, (September 1980). Note, however, that you would need to make the block-move routine pass control back to BASIC (at 6CCH) as soon as it has moved the program, rather than transfer control to the machine language program itself). Those using an editor/assembler to enter the program should ignore the first two columns in the listing and start with column 3, which contains the line numbers. For those using a monitor, the machine language program is shown in the two columns down the left-hand side of the listing. The first column contains the address and the second the actual program material in Hex. Select EDIT or CHANGE MEMORY mode in your monitor starting at 7C00H, enter 21. The monitor will automatically move on to 7C01H. You should then enter 95. At 7C02H enter 77, at 7C03H enter 22 and so on until you reach 77EFH, which you should leave unaltered and exit the EDIT mode. Note that the addresses 3C00H, 3C1FH and 3C56H, which are in screen RAM, are also shown in the listing as being altered. These addresses are used by the machine language program to print messages directly on to the screen whilst the program is loading. If you enter the program with a monitor rather than an editor/assembler, this facility will not be available to you and you will need to be content with using the normal method of loading machine language programs.

Once you have entered the machine language program, punch out a SYSTEM tape. If you have used an editor/assembler, the necessary parameters will be automatically provided on the tape. If you have entered the program via a monitor, punch the tape using the following parameters:-

START=766BH END=7CFEH ENTRY=7795H

Now, enter the BASIC listing and CSAVE it.

When reloading LIFE from tape first protect Memory size at 30314 then:-

- 1) Type "SYSTEM"
- 2) Press (ENTER/NEWLINE)
- 3) ANSWER "*" with "LIFE". Press (ENTER/NEWLINE)
- 4) When the second "*" ?" appears, answer with "/"
- 5) A message will then appear on the screen explaining the changes you need to make to the original BASIC program. If you are using the original BASIC listing, make these changes. If you have entered the listing from this issue, ignore the message.
- 6) CLOAD in the BASIC program and type RUN.

The game of LIFE was originally discussed in the Scientific American some years ago. It isn't really a game at all, but a rather complex set of rules governing the growth of cells (or civilisations), which this program illustrates graphically on the 80's screen.

The rules are as follows:-

- 1) Each cell (2X by 1Y in this version) is capable of life
- 2) Life will be created in a cell location if it has exactly three living neighbours.
- 3) Life will continue if a cell has only two or three living neighbours.
- 4) Life will cease if a cell has less than two living neighbours (we all need some companionship).
- 5) Life will cease if a cell has more than three living neighbours (since three cells are required to create life it stands to reason that "four's a crowd" therefore five is unlivable).
- 6) All births and deaths must occur simultaneously.

This version of LIFE is in two parts. The BASIC program is quite self explanatory, offering the option of user or computer generated starting patterns, variable generation speeds (up to one per second) and single key termination at any time. The machine language routine does all the real work, making massive use of subroutines. Each run through the routine will create one new generation. The original concept of life was that the overall population would enjoy periods of growth and expansion, suffer periods of recession and contraction and that in all cases would stabilise - with either a pattern of growth and contraction that repeats continuously or with a stable and non-changing pattern.

This has always proved to be the case !

765B	00100	BOTTOM	EQU	765BH
77EE	00110	WORKA	EQU	BOTTOM+183H
7800	00120	STORE1	EQU	BOTTOM+195H
7C00	00130	STORE2	EQU	BOTTOM+595H
3C00	00140		ORG	3C00H
3C00 2A	00150		DEFM	'**** LOADING LIFE S/R ** WAIT F'
3C1F 4F	00160		DEFM	'OR "GOOD LOAD" THEN ENTER "/"**'
7C00	00170		ORG	STORE2
7C00 219577	00180		LD	HL,ENTER
7C03 228E40	00190		LD	(408EH),HL
7C06 21003C	00200		LD	HL,3C00H
7C09 01FF03	00210		LD	BC,3FFH
7C0C 11013C	00220		LD	DE,3C01H
7C0F 3620	00230		LD	(HL),20H
7C11 EDB0	00240		LDIR	
7C13 21217C	00250		LD	HL,TEXT
7C16 11003C	00260		LD	DE,3C00H
7C19 01DD00	00270		LD	BC,0DDH
7C1C EDB0	00280		LDIR	
7C1E C3191A	00290		JP	1A19H
7C21 4C	00300	TEXT	DEFM	'LOAD OR ENTER SEEDING PROGRAM.'
7C3F 20	00310		DEFM	'ENTRY POINT FOR USR(0) ROUTIN'
7C5D 45	00320		DEFM	'E HAS BEEN STORED. POKE STAT'
7C7B 45	00330		DEFM	'EMENTS SHOULD BE REMOVED FROM '
7C99 4C	00340		DEFM	'LINE 10 OF MICRO-80 PROGRAM, B'
7CB7 55	00350		DEFM	'UT DO NOT DELETE LINE OR UL ER'

7CD5 52	00360	DEFM	'ROR WILL ARISE AT LINE 210.'
7CF3 20	00370	DEFM	' GOOD LUCK!'
766B	00380	ORG	BOTTOM
766B 21003C	00390	LD	HL,3C00H
766E 110078	00400	LD	DE,STORE1
7671 010004	00410	LD	BC,400H
7674 EDB0	00420	LDIR	
7676 210078	00430	LD	HL,STORE1
7679 22EE77	00440	LD	(WORKA),HL
767C 23	00450	INC	HL
767D 22F077	00460	LD	(WORKA+2),HL
7680 23	00470	INC	HL
7681 22F277	00480	LD	(WORKA+4),HL
7684 214078	00490	LD	HL,STORE1+64
7687 22F477	00500	LD	(WORKA+6),HL
768A 23	00510	INC	HL
768B 22F677	00520	LD	(WORKA+8),HL
768E 23	00530	INC	HL
768F 22F877	00540	LD	(WORKA+10),HL
7692 218078	00550	LD	HL,STORE1+128
7695 22FA77	00560	LD	(WORKA+12),HL
7698 23	00570	INC	HL
7699 22FC77	00580	LD	(WORKA+14),HL
769C 23	00590	INC	HL
769D 22FE77	00600	LD	(WORKA+16),HL
76A0 21007C	00610	LD	HL,STORE2
76A3 01FF03	00620	LD	BC,3FFH
76A6 11017C	00630	LD	DE,STORE2+1
76A9 3680	00640	LD	(HL),80H
76AB EDB0	00650	LDIR	
76AD 21417C	00660	LD	HL,STORE2+65
76B0 017E03	00670	LD	BC,37EH
76B3 3E00	00680	LD	A,0
76B5 C9	00690	RET	
76B6 CB46	00700	TEST0	BIT 0,(HL)
76B8 C8	00710	RET	Z
76B9 3C	00720	INC	A
76BA C9	00730	RET	
76BB CB56	00740	TEST2	BIT 2,(HL)
76BD C9	00750	RET	Z
76BE 3C	00760	INC	A
76BF C9	00770	RET	
76C0 CB66	00780	TEST4	BIT 4,(HL)
76C2 C8	00790	RET	Z
76C3 3C	00800	INC	A
76C4 C9	00810	RET	
76C5 2AEE77	00820	HIRO	LD HL,(WORKA)
76C8 CDC076	00830	CALL	TEST4
76CB 2AF077	00840	LD	HL,(WORKA+2)
76CE CDC076	00850	CALL	TEST4
76D1 2AF277	00860	LD	HL,(WORKA+4)
76D4 CDC076	00870	CALL	TEST4
76D7 C9	00880	RET	
76D8 2AFA77	00890	LORO	LD HL,(WORKA+12)
76DB CDB676	00900	CALL	TEST0
76DE 2AFC77	00910	LD	HL,(WORKA+14)
76E1 CDB676	00920	CALL	TEST0
76E4 2AFE77	00930	LD	HL,(WORKA+16)
76E7 CDB676	00940	CALL	TEST0
76EA C9	00950	RET	
76EB 2AF477	00960	LSIDE	LD HL,(WORKA+6)
76EE CDBB76	00970	CALL	TEST2
76F1 C9	00980	RET	
76F2 2AF877	00990	RSIDE	LD HL,(WORKA+10)
76F5 CDBB76	01000	CALL	TEST2
76F8 C9	01010	RET	
76F9 3E00	01020	HISCAN	LD A,0
76FB CDC576	01030	CALL	HIRO
76FE CDEB76	01040	CALL	LSIDE
7701 CDB676	01050	CALL	TEST0
7704 2AF677	01060	LD	HL,(WORKA+8)
7707 CDBB76	01070	CALL	TEST2
770A CDF276	01080	CALL	RSIDE
770D CDB676	01090	CALL	TEST0

7710	C9	01100	RET	
7711	3E00	01110	CSCAN	LD A,0
7713	CDEB76	01120	CALL	LSIDE
7716	CDB676	01130	CALL	TEST0
7719	CDC076	01140	CALL	TEST4
771C	2AF677	01150	LD	HL,(WORKA+8)
771F	CDB676	01160	CALL	TEST0
7722	CDC076	01170	CALL	TEST4
7725	CDF276	01180	CALL	RSIDE
7728	CDB676	01190	CALL	TEST0
772B	CDC076	01200	CALL	TEST4
772E	C9	01210	RET	
772F	3E00	01220	LOSCAN	LD A,0
7731	CDEB76	01230	CALL	LSIDE
7734	CDC076	01240	CALL	TEST4
7737	CDD876	01250	CALL	LOR0
773A	CDF276	01260	CALL	RSIDE
773D	CDC076	01270	CALL	TEST4
7740	2AF677	01280	LD	HL,(WORKA+8)
7743	CDBB76	01290	CALL	TEST2
7746	C9	01300	RET	
7747	D9	01310	STAGE1	EXX
7748	CDF976	01320	CALL	HISCAN
774B	3D	01330	DEC	A
774C	3D	01340	DEC	A
774D	200F	01350	JR	NZ,BIT31
774F	2AF677	01360	LD	HL,(WORKA+8)
7752	CB46	01370	BIT	0,(HL)
7754	280B	01380	JR	Z,STAGE2
7756	D9	01390	SET1	EXX
7757	CBC6	01400	SET	0,(HL)
7759	CBCE	01410	SET	1,(HL)
775B	D9	01420	EXX	
775C	1803	01430	JR	STAGE2
775E	3D	01440	BIT31	DEC A
775F	28F5	01450	JR	Z,SET1
7761	CD1177	01460	STAGE2	CALL CSCAN
7764	3D	01470	DEC	A
7765	3D	01480	DEC	A
7766	200F	01490	JR	NZ,BIT32
7768	2AF677	01500	LD	HL,(WORKA+8)
776B	CB56	01510	BIT	2,(HL)
776D	280B	01520	JR	Z,STAGE3
776F	D9	01530	SET2	EXX
7770	CBD6	01540	SET	2,(HL)
7772	CBDE	01550	SET	3,(HL)
7774	D9	01560	EXX	
7775	1803	01570	JR	STAGE3
7777	3D	01580	BIT32	DEC A
7778	28F5	01590	JR	Z,SET2
777A	CD2F77	01600	STAGE3	CALL LOSCAN
777D	3D	01610	DEC	A
777E	3D	01620	DEC	A
777F	200F	01630	JR	NZ,BIT33
7781	2AF677	01640	LD	HL,(WORKA+8)
7784	CB66	01650	BIT	4,(HL)
7786	280B	01660	JR	Z,BACK
7788	D9	01670	SET3	EXX
7789	CBE6	01680	SET	4,(HL)
778B	CBEE	01690	SET	5,(HL)
778D	D9	01700	EXX	
778E	1803	01710	JR	BACK
7790	3D	01720	BIT33	DEC A
7791	28F5	01730	JR	Z,SET3
7793	D9	01740	BACK	EXX
7794	C9	01750	RET	
7795	CD6B76	01760	ENTER	CALL START
7798	CD4777	01770	AGAIN	CALL STAGE1
779B	D9	01780	EXX	
779C	2AEE77	01790	LD	HL,(WORKA)
779F	23	01800	INC	HL
77A0	22EE77	01810	LD	(WORKA),HL
77A3	2AF077	01820	LD	HL,(WORKA+2)
77A6	23	01830	INC	HL


```

77A7 22F077 01840 LD (WORKA+2),HL
77AA 2AF277 01850 LD HL,(WORKA+4)
77AD 23 01860 INC HL
77AE 22F277 01870 LD (WORKA+4),HL
77B1 2AF477 01880 LD HL,(WORKA+6)
77B4 23 01890 INC HL
77B5 22F477 01900 LD (WORKA+6),HL
77B8 2AF577 01910 LD HL,(WORKA+8)
77BB 23 01920 INC HL
77BC 22F677 01930 LD (WORKA+8),HL
77BF 2AF877 01940 LD HL,(WORKA+10)
77C2 23 01950 INC HL
77C3 22F877 01960 LD (WORKA+10),HL
77C6 2AFA77 01970 LD HL,(WORKA+12)
77C9 23 01980 INC HL
77CA 22FA77 01990 LD (WORKA+12),HL
77CD 2AFC77 02000 LD HL,(WORKA+14)
77D0 23 02010 INC HL
77D1 22FC77 02020 LD (WORKA+14),HL
77D4 2AFE77 02030 LD HL,(WORKA+16)
77D7 23 02040 INC HL
77D8 22FE77 02050 LD (WORKA+16),HL
77DB 09 02060 EXX
77DC 23 02070 INC HL
77DD 0B 02080 DEC BC
77DE 78 02090 LD A,B
77DF B1 02100 OR C
77E0 20B6 02110 JR NZ,AGAIN
77E2 21007C 02120 LD HL,STORE2
77E5 11003C 02130 LD DE,3C00H
77E8 010004 02140 LD BC,400H
77EB EDB0 02150 LDIR
77ED C9 02160 RET
3C56 02170 ORG 3C56H
3C56 2A 02180 DEFM '***** GOOD LOAD *****'
7C00 02190 END STORE2
000000 TOTAL ERRORS

```

```

AGAIN 7798 01770 02110
BACK 7793 01740 01660 01710
BIT31 775E 01440 01350
BIT32 7777 01580 01490
BIT33 7790 01720 01630
BOTTOM 766B 00100 00110 00120 00130 00380
CSCAN 7711 01110 01460
ENTER 7795 01760 00180
HIRO 76C5 00820 01030
HISCAN 76F9 01020 01320
LORO 76D8 00890 01250
LOSCAN 772F 01220 01600
LSIDE 76EB 00960 01040 01120 01230
RSIDE 76F2 00990 01080 01180 01260
SET1 7756 01390 01450
SET2 776F 01530 01590
SET3 7788 01670 01730
STAGE1 7747 01310 01770
STAGE2 7761 01460 01380 01430
STAGE3 777A 01600 01520 01570
START 766B 00390 01760
STORE1 7800 00120 00400 00430 00490 00550
STORE2 7C00 00130 00170 00610 00630 00660 02120 02190
TEST0 76B6 00700 00900 00920 00940 01050 01090 01130 01160
01190
TEST2 76BB 00740 00970 01000 01070 01290
TEST4 76C0 00780 00830 00850 00870 01140 01170 01200 01240
01270
TEXT 7C21 00300 00250
WORKA 77EE 00110 00440 00460 00480 00500 00520 00540 00560
00580 00600 00820 00840 00860 00890 00910
00930 00960 00990 01060 01150 01280 01360
01500 01640 01790 01810 01820 01840 01850
01870 01880 01900 01910 01930 01940 01960
01970 01990 02000 02020 02030 02050

```

```

2 GAME OF LIFE - BASIC LISTING
5 CLS:INPUT"OPERATING SPEED (0) FAST (9) SLOW";Q:Q=Q*250
10 REMEMBER THIS WAS THE POKE LINE
20 CLS:PRINT"INITIAL PATTERN BY (O)PERATOR OR (C)OMPUTER?":D$=INKEY$:D$=""
30 D$=INKEY$:IFD$=""THEN30ELSEIFD$="O"THEN50ELSEIFD$="C"THEN40ELSE30
40 FORX=46TO68STEP2:FORY=15TO24:Z=RND(03):IFZ<>3THENNEXT:NEXT:GOTO200:ELSESET(X,
Y):SET(X+1,Y):SET(127-X,Y):SET(126-X,Y):SET(X,47-Y):SET(X+1,47-Y):SET(127-X,47-Y
Y):SET(126-X,47-Y):NEXT:NEXT:GOTO200
50 CLS:PRINT"CONTROL THE CELLS WITH THE FOLLOWING KEYS---
      TRS-80      :      SYSTEM-80
MOVE UP          UP ARROW      ESC
MOVE DOWN        DOWN ARROW    CONTROL
MOVE LEFT        <              <
MOVE RIGHT       >              >"
51 PRINT"REPEAT          S          S
EXECUTE              ENTER          NEWLINE":D$=INKEY$:D$=""
55 D$="":D$=INKEY$:IFD$=""THEN55ELSECLS
60 D$="":D$=INKEY$:RESET(X,Y):RESET(X+1,Y):IFD$=""THEN150ELSEIFD$="S"THEN190ELSE
Z=ASC(D$)
70 IFZ=91THENY=Y-1:IFY<0THENY=0:GOTO150
80 IFZ=10THENY=Y+1:IFY>47THENY=47:GOTO150
90 IFZ=46THENX=X+2:IFX>127THENX=127:GOTO150
100 IFZ=44THENX=X-2:IFX<0THENX=0:GOTO150
110 IFZ=13THENGOTO210
150 SET(X,Y):SET(X+1,Y):GOTO60
190 SET(X,Y):SET(X+1,Y):GOTO70
200 PRINT@0,"ANY KEY WILL TERMINATE RUN.                  ":FORT=0TO2000:NEXT
:PRINT@0," ";:PRINTCHR$(28);:PRINTCHR$(30);
210 X=USR(0):D$="":D$=INKEY$:IFD$<>" "THEN10ELSEFORK=0TOQ:NEXT:GOTO210

```

TENNIS (L2/4K m/1)

by J. PINAKIS

This program is an assembly language simulation of the popular video tennis game. It was originally written to demonstrate how many of the LEVEL II ROM routines can be used in a program to simplify development. Since the program was written with user modification in mind, as many comments as possible have been included. Due to buffer restrictions in the EDITOR/ASSEMBLER, many of the more recent sections of the program are uncommented but these will be explained later.

LOADING

The program will load into a Level II '80 with 4K or more memory. Using a suitable monitor or the editor/assembler, load in the Hex or source code. BMON is quite suitable for entering this program as it resides in a different memory location from the program itself. The machine language listing occupies the two left-hand columns in the main listing whilst the source code for an editor/assembler starts with the line numbers in column 3.

If you are using a monitor, enter the EDIT or CHANGE MEMORY mode at 4A00H. Change this location to CD. The monitor will automatically advance to location 4A01. Enter C9. At 4A02 enter 01, at 4A03 enter CD and so on until you reach 4C7B which you should leave unchanged and exit the EDIT mode. Now, punch a SYSTEM tape using the following parameters:-

```

      START=4A00H      END=4C7AH      ENTRY=4A00H      NAME TENNIS

```

To load the program from tape:-

- 1) Type SYSTEM. Press the ENTER or NEWLINE key
- 2) The computer will respond with *?
- 3) Type TENNIS. Press the ENTER or NEWLINE key
- 4) The program will then begin to load. When it has loaded the computer will return with *?
- 5) Type / . Press the ENTER or NEWLINE key and the program will begin to run.

USE

Use of the tennis simulation is simple. After the "/" is typed in and ENTER/NEWLINE is pressed, the program will commence by drawing a line down the centre of the screen along with some other information. This line represents the boundary of the tennis court. The game is played to the left of this line and scores are recorded to its right together with any necessary questions. In the playing area, you will see a short line which lies just to the left of the main boundary. This is your bat and can be moved up or down by simply depressing the appropriate key:-

TRS-80	SYSTEM 80	DIRECTION
UP ARROW	ESC	Move bat up
DOWN ARROW	CONTROL	Move bat down

Hold the key down until the bat reaches the desired position. The ball, (which appears as a single white dot) will begin at a random point on the extreme left of the playing area and will bounce up or down until it either reaches the end of the playing area or it hits the bat. If it hits the bat, it bounces off and one is added to the "HIT" score which is displayed on the right hand side of the boundary. If it reaches the end of the playing area, one is added to the "MISS" score and a new ball is served from a random location on the extreme left of the screen. Note that there is a short delay between missing a ball and another one being served and that during this delay the bat cannot be moved.

SCORING

You are allowed to miss twenty five balls before the "GAME OVER" message is displayed. Your score is then the value which is displayed alongside the "HIT" message. Once the game is over, you are asked to press either "ENTER" or "BREAK". If you press ENTER (or NEWLINE) the game will begin again and if you press BREAK the computer is returned to the READY mode in BASIC.

PROGRAM DETAILS

Tennis loads into memory from 4A00H to 4C7AH with an entry address of 4A00H. Most of the program has been commented. The uncommented sections will be explained here.

The first of these is MESGES which is called during programme initialization. This displays messages MES1 to MES3 by setting up the HL and DE register pairs and calling a general purpose output routine.

Next there is OVER which is jumped to by INCMIS after all 25 balls have been used. Upon entry, it POPS the return address off the stack which was placed there when the INCMIS routine is called by the SERVE routine. It then displays messages MES4 to MES8 in much the same way as MESGES does. The general purpose routine which is used by both MESGES and OVER is DISP. This prints the message pointed to by HL at the screen position in DE. This is accomplished by loading the cursor address (4020H) with the desired location and then using a ROM routine to output the message. Note that the message to be output must be terminated by a zero byte.

The INPT routine simply waits until either the ENTER/NEWLINE key or BREAK key is pressed and then jumps to either INIT or reenters into BASIC at 6CCH respectively.

VARIABLE TABLE

These are the memory locations which are used to store certain values during program execution.

XCOOR	This is the X coordinate of the ball
YCOOR	This is the Y coordinate of the ball
XINC	This is the value which is added to the X coordinate each time the ball moves.
YINC	This is the value which is added to the Y coordinate each time the ball moves.
BATLOC	This location contains the bat's address in memory.
HIT	This is the number of times that the ball has been hit.
MISS	This is the number of times that the ball has been missed.

As all the important values are stored in these locations, none of the Z-80 registers are used to store any values. This means that the user can use these registers with no fear of upsetting any values.

USER MODIFICATION

As mentioned previously, this program was written in such a way that it is able to be easily modified by the user. These are some tips and some more things you should know if you do wish to modify the program. The simplest of user modifications is the adjustment of game speed. If you think that the game is too fast or too slow, then you can simply adjust the value that is loaded into the BC register pair immediately on entry to the DELAY subroutine. To make the game slower, this value should be increased (try steps of about 300). To make the game faster this value should be decreased but not to less than about 700. Perhaps the more enterprising reader could write a routine which allows the player to choose between a number of set speeds, from the keyboard. Another simple modification is the ball angle. To adjust this, simply adjust the values in (XINC) and (YINC). The YINC value can be changed to any number but care should be taken in adjusting the XINC value for if it is wrongly adjusted the ball may pass straight through the bat. Again, the more advanced user might care to write a routine which sets the ball angle randomly or asks the player for a choice of high or low angles. While on the subject of random numbers. The reader is reminded that the subroutine GETRND will generate a random number between one and the value stored in the HL register pair and places the result in DE.

Note that to use this routine in another program, the short routine INITRM must also be entered and run at some early stage in the user's program. This is because the random number generator needs the locations from 4090H to 4092H to be initialized because this contains the multiplicative mantissa constant used in the random number generator (well you wanted to know!). Perhaps this program could even be the basis for a larger two player game. YOUR SERVE !!!

```

00100 ;TENNIS SIMULATION
00110 ;JAMES PINAKIS
00120 ;3 RIVERVIEW COURT,
00130 ;DALKEITH WA 6009.

4A00      00140      ORG      4A00H
4A00 CDC901 00150 INIT      CALL      1C9H      ;CLEAR SCREEN
4A03 CD534B 00160      CALL      MESGES      ;DISPLAY MES1 & MES2
4A06 AF      00170      XOR      A
4A07 32104C 00180      LD      (XCOORD),A
4A0A 32114C 00190      LD      (YCOORD),A
4A0D 32164C 00200      LD      (HIT),A
4A10 32174C 00210      LD      (MISS),A
4A13 21203C 00220      LD      HL,3C00H+32      ;BAT LOCATION
4A16 22144C 00230      LD      (BATLOC),HL      ;SAVE
4A19 3EAA      00240      LD      A,0AAH      ;BAT CHARACTER
4A1B 77      00250      LD      (HL),A      ;DISPLAY BAT
4A1C CD444B 00260      CALL      BORDER      ;DRAW LINE DOWN SCREEN
00270 ; INITIALIZE RAM FOR RND FUNCTION
4A1F 110040 00280 INITRM LD      DE,4080H
4A22 21F718 00290      LD      HL,18F7H
4A25 012700 00300      LD      BC,39
4A28 EDB0      00310      LDIR
4A2A CD274B 00320 INIT1 CALL      RANDOM      ;RANDOM START LOCATION FOR BALL.
00330 ; ACTUAL PROGRAM STARTS HERE.
4A2D CD6C4A 00340 LOOP      CALL      SET      ;SET BALL LOCATION
4A30 CD834A 00350      CALL      DELAY      ;WAIT AWHILE
4A33 CDB24A 00360      CALL      KBOARD      ;TEST FOR BAT MOVEMENT
4A36 CD714A 00370      CALL      RESET      ;RESET BALL LOCATION
00380 ; INCX INCREMENTS THE X COORDINATE OF THE BALL BY THE
00390 ; VALUE (XINC)
4A39 21124C 00400 INCX      LD      HL,XINC ;X INCREMENT LOCATION
4A3C 3A104C 00410      LD      A,(XCOORD)      ;PUT X COOR. IN A
4A3F 86      00420      ADD      A,(HL)      ;ADD TO X COORDINATE
00430 ; TESTX TESTS THE X COORDINATE TO SEE IF IT IS TOO LARGE
00440 ; OR TOO SMALL.
4A40 FE4B      00450 TESTX CP      75      ;END OF COURT?
4A42 F21B4B 00460      JP      P,SERVE ;YES. SERVE NEW BALL
4A45 FE00      00470      CP      0      ;HITTING WALL?
4A47 FABF4B 00480      JP      M,FIXX1 ;YES. BOUNCE BALL
4A4A 32104C 00490 SAVX      LD      (XCOORD),A      ;X COOR. OK SO SAVE IT
00500 ; INCY INCREMENTS THE Y COORDINATE BY THE VALUE (YINC)
4A4D 21134C 00510 INCY      LD      HL,YINC ;Y INCREMENT LOCATION
4A50 3A114C 00520      LD      A,(YCOORD)      ;Y COOR. TO A
4A53 86      00530      ADD      A,(HL)      ;ADD Y COOR TO A
00540 ; TESTY TESTS THE Y COORDINATE TO SEE IF IT IS TOO LARGE
00550 ; OR TOO SMALL.
4A54 FE2F      00560 TESTY CP      47      ;BOTTOM WALL?
4A56 F29D4A 00570      JP      P,FIXY ;YES SO BOUNCE.
4A59 FE00      00580      CP      0      ;TOP WALL?
4A5B FA9D4A 00590      JP      M,FIXY ;YES SO BOUNCE.
4A5E 32114C 00600 SAVY      LD      (YCOORD),A      ;Y COOR. OK SO SAVE IT.
4A61 CD044B 00610 CONT      CALL      TEST      ;SEE IF THE BALL HIT THE BAT
4A64 C32D4A 00620      JP      LOOP      ;DO IT ALL AGAIN

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00630 ; SUBROUTINES CALLED BY MAIN ROUTINE BEGIN HERE.
00640 ; THIS SUBROUTINE PERFORMS SET, RESET OR POINT
4A67 3E00 00650 POINT LD A,00H ;LOAD FLAG WITH VALUE FOR POINT
4A69 C3734A 00660 JP GRAFIX ;JUMP TO MAIN ROUTINE
4A6C 3E80 00670 SET LD A,80H ;LOAD FLAG WITH VALUE FOR SET
4A6E C3734A 00680 JP GRAFIX ;JUMP TO MAIN ROUTINE
4A71 3E01 00690 RESET LD A,01H ;LOAD FLAG WITH VALUE FOR RESET
4A73 67 00700 GRAFIX LD H,A ;SAVE FLAG
4A74 3A104C 00710 LD A,(XCOORD) ;GET X COOR.
4A77 47 00720 LD B,A ;SAVE X COOR.
4A78 3A114C 00730 LD A,(YCOORD) ;GET Y COOR.
4A7B E5 00740 PUSH HL ;SAVE FLAG TO STACK
4A7C C5 00750 PUSH BC ;SAVE X COOR.
4A7D 218C18 00760 LD HL,188CH ;POINT TO DUMMY STRING
4A80 C35001 00770 JP 150H ;TO GRAPHICS ROUTINE
00780 ; DELAY SIMPLY EXECUTES A SHORT PAUSE AND THEN RETURNS.
4A83 01D007 00790 DELAY LD BC,2000 ;TO MAKE GAME SLOWER INCREASE
00800 ; THIS VALUE
4A86 CD6000 00810 CALL 60H
4A89 C9 00820 RET
00830 ; FIXX WILL SUBTRACT THE X INCREMENT FROM THE X COOR.
00840 ; AND NEGATES THE X INCREMENT SO THAT THE BALL BOUNCES.
4A8A 3A104C 00850 FIXX LD A,(XCOORD) ;GET X COORDINATE
4A8D 21124C 00860 LD HL,XINC ;GET LOCATION OF X INCREMENT
4A90 96 00870 SUB (HL) ;SUBTRACT THE X INCREMENT FROM
00880 ; THE X COORDINATE.
4A91 32104C 00890 LD (XCOORD),A ;SAVE IT.
4A94 3A124C 00900 LD A,(XINC) ;GET X INCREMENT
4A97 ED44 00910 NEG ;NEGATE IT.
4A99 32124C 00920 LD (XINC),A ;PUT IT BACK.
4A9C C9 00930 RET
00940 ; FIXY DOES THE SAME TO THE Y COORDINATE AS FIXX DID TO
00950 ; TO THE X COORDINATE.
4A9D 3A114C 00960 FIXY LD A,(YCOORD)
4AA0 21134C 00970 LD HL,YINC
4AA3 96 00980 SUB (HL)
4AA4 32114C 00990 LD (YCOORD),A
4AA7 3A134C 01000 LD A,(YINC)
4AAA ED44 01010 NEG
4AAC 32134C 01020 LD (YINC),A
4AAF C3614A 01030 JP CONT
01040 ; KBOARD SCANS THE KEYBOARD FOR THE UP ARROW AND DOWN
01050 ; ARROW KEYS.
4AB2 3A403B 01060 KBOARD LD A,(3840H) ;LOCATION OF ARROW KEYS
4AB5 B7 01070 OR A ;KEY PRESSED?
4AB6 C8 01080 RET Z ;NO...RETURN
4AB7 FE08 01090 CP 8 ;UP ARROW?
4AB9 CAC24A 01100 JP Z,MOVUP ;YES...MOVE BAT UP.
4ABC FE10 01110 CP 16 ;DOWN ARROW?
4ABE CAE34A 01120 JP Z,MOVDN ;YES...MOVE BAT DOWN.
4AC1 C9 01130 RET
01140 ; MOVUP MOVES THE BAT UP THE SCREEN
4AC2 3E20 01150 MOVUP LD A,20H ;ASCII FOR SPACE.
4AC4 2A144C 01160 LD HL,(BATLOC) ;GET BAT LOCATION.
4AC7 77 01170 LD (HL),A ;ERASE OLD BAT.
4AC8 114000 01180 LD DE,64 ;DECREMENT VALUE
4ACB B7 01190 OR A ;CLEAR CARRY
4ACC ED52 01200 SBC HL,DE ;SUBTRACT 64 FROM BAT LOCATION
4ACE 11003C 01210 LD DE,3C00H ;START OF SCREEN
4AD1 CD390A 01220 CALL 0A39H ;CP HL&DE
01230 ; THE FLAGS.
4AD4 FCDE4A 01240 CALL M,TOOSML ;S FLAG SET IF HL<DE
4AD7 22144C 01250 LD (BATLOC),HL ;SAVE NEW BAT LOCATION
4ADA 3EAA 01260 LD A,0AAH ;BAT CHARACTER IN ASCII
4ADC 77 01270 LD (HL),A ;TO DISPLAY
4ADD C9 01280 RET
01290 ; THIS SUBROUTINE IS CALLED IF HL IS SMALLER THAN 3C00H
4ADE 114000 01300 TOOSML LD DE,64 ;INCREMENT VALUE
4AE1 19 01310 ADD HL,DE ;ADD TO WRONG BAT LOCATION
4AE2 C9 01320 RET
01330 ; MOVDN MOVES THE BAT DOWN THE SCREEN
4AE3 3E20 01340 MOVDN LD A,20H ;ASCII BLANK
4AE5 2A144C 01350 LD HL,(BATLOC) ;OLD BAT LOCATION

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4AE8 77      01360      LD      (HL),A ;ERASE OLD BAT
4AE9 114000  01370      LD      DE,64 ;INCREMENT VALUE
4AEC 19      01390      ADD     HL,DE ;ADD DE TO HL
4AED 11FF3F  01390      LD      DE,3FFFH ;END OF VIDEO SCREEN
4AF0 CD390A  01400      CALL    0A39H ;COMPARE HL AND DE
4AF3 F4FD4A  01410      CALL    P,T00BIG ;S FLAG RESET IF HL<DE
4AF6 22144C  01420      LD      (BATLOC),HL ;SAVE NEW BAT LOCATION
4AF9 3EAA    01430      LD      A,0AAH ;BAT VALUE IN ASCII
4AFB 77      01440      LD      (HL),A ;DISPLAY IT.
4AFC C9      01450      RET
                                01460 ; THIS SUBROUTINE IS CALLED IF HL IS LARGER THAN 3FFFH
4AFD B7      01470 T00BIG OR      A ;CLEAR CARRY
4AFE 114000  01480      LD      DE,64 ;DECREMENT VALUE
4B01 ED52    01490      SBC     HL,DE ;SUBTRACT DE FROM HL
4B03 C9      01500      RET
                                01510 ; TEST SEES IF THE BALL HAS HIT THE BAT AND INCREMENTS
                                01520 ; THE HIT SCORE AND BOUNCES THE BALL ACCORDINGLY.
4B04 3EAA    01521 TEST LD      A,0AAH ;REDRAW BAT
4B06 2A144C  01522      LD      HL,(BATLOC)
4B09 77      01523      LD      (HL),A
4B0A CD674A  01530      CALL    POINT ;IS BALL LOCATION SET?
4B0D CD052B  01540      CALL    2B05H ;LOAD RESULT OF TEST INTO DE
4B10 7B      01550      LD      A,E ;LOAD RESULT INTO A
4B11 FE00    01560      CP      0 ;SET?
4B13 C8      01570      RET     Z ;NO...RETURN
4B14 CD6F4B  01580      CALL    INCHIT ;YES...INCREMENT HIT VALUE
4B17 CD8A4A  01590      CALL    FIXX ;AND BOUNCE BALL OFF BAT
4B1A C9      01600      RET
                                01610 ; SERVE INCREMENTS THE MISS VALUE AND DOES A SHORT DELAY
                                01620 ; BEFORE SERVING ANOTHER BALL.
4B1B CD7E4B  01630 SERVE CALL    INCMIS ;INCREMENT MISS VALUE
4B1E 010000  01640      LD      BC,0 ;SET DELAY VALUE
4B21 CD6000  01650      CALL    60H ;DO DELAY
4B24 C32A4A  01660      JP      INIT1 ;SERVE BALL
                                01670 ; RANDOM ESTABLISHES A RANDOM START LOCATION FOR NEW BALL
4B27 212F00  01680 RANDOM LD      HL,47 ;MAXIMUM Y VALUE
4B2A CD374B  01690      CALL    GETRND ;GET RANDOM NUMBER
4B2D 7B      01700      LD      A,E ;RANDOM NUMBER TO A
4B2E 32114C  01710      LD      (YCOORD),A ;PUT IT IN Y COORDINATE
4B31 3E00    01720      LD      A,0 ;FIRST X LOCATION
4B33 32104C  01730      LD      (XCOORD),A ;PUT IT IN X COORDINATE
4B36 C9      01740      RET
                                01750 ;GETRND GENERATES A RANDOM NUMBER BETWEEN 1 AND THE VALUE
                                01760 ; IN THE HL REGISTER PAIR. THE RESULT IS PLACED IN THE
                                01770 ; DE REGISTER PAIR.
4B37 CD9A0A  01780 GETRND CALL    0A9AH ;SAVE HL IN ACCUMULATOR
4B3A CDC914  01790      CALL    14C9H ;GENERATE RANDOM NUMBER
4B3D CD7F0A  01800      CALL    0A7FH ;CONVERT TO INTEGER
4B40 CD052B  01810      CALL    2B05H ;PUT ACCUMULATOR IN DE
4B43 C9      01820      RET
                                01830 ; BORDER DISPLAYS THE LINE DOWN THE CENTER OF THE SCREEN
4B44 21263C  01840 BORDER LD      HL,3C00H+38 ;START LOCATION ON LINE 0
4B47 0610    01850      LD      B,15 ;NUMBER OF LINES OF SCREEN
4B49 3E95    01860      LD      A,95H ;DISPLAY BYTE
4B4B 114000  01870      LD      DE,64 ;INCREMENT VALUE
4B4E 77      01880 LOOP1 LD      (HL),A ;DISPLAY BYTE
4B4F 19      01890      ADD     HL,DE ;ADD INCREMENT TO SCREEN LOCATION
4B50 10FC    01900      DJNZ    LOOP1 ;REPEAT 15 TIMES
4B52 C9      01910      RET
                                01920 ; MESGES DISPLAYS MESSAGES 1,2 AND 3 AT SET LOCATIONS
4B53 21184C  01930 MESGES LD      HL,MES1
4B56 116E3C  01940      LD      DE,15470
4B59 CDC54B  01950      CALL    DISP
4B5C 21244C  01960      LD      HL,MES2
4B5F 11EE3C  01970      LD      DE,15598
4B62 CDC54B  01980      CALL    DISP
4B65 212A4C  01990      LD      HL,MES3
4B68 116E3D  02000      LD      DE,15726
4B6B CDC54B  02010      CALL    DISP
4B6E C9      02020      RET
                                02030 ; INCHIT INCREMENTS THE NUMBER OF TIMES THAT THE BALL
                                02040 ; WAS HIT AND DISPLAYS IT.
4B6F 3A164C  02050 INCHIT LD      A,(HIT) ;GET OLD HIT VALUE
4B72 3C      02060      INC     A ;INCREMENT

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4B73 27      02070      DAA                      ;ADJUST FOR BCD
4B74 32164C  02080      LD      (HIT),A          ;STORE NEW HIT VALUE
4B77 21F33C  02090      LD      HL,15603         ;LOCATION TO DISPLAY AT
4B7A CD954B  02100      CALL    DISSCR           ;DISPLAY HIT VALUE
4B7D C9      02110      RET
02120 ; INCMIS INCREMENTS THE NUMBER OF TIMES THAT THE BALL
02130 ; WAS MISSED AND DISPLAYS IT.
4B7E 3A174C  02140 INCMIS LD      A,(MISS)        ;GET OLD MISS VALUE
4B81 3C      02150      INC      A              ;INCREMENT IT
4B82 27      02160      DAA                      ;ADJUST FOR BCD
4B83 32174C  02170      LD      (MISS),A         ;SAVE NEW SCORE
4B86 21753D  02180      LD      HL,15733         ;LOCATION TO DISPLAY AT
4B89 CD954B  02190      CALL    DISSCR           ;DISPLAY SCORE
4B8C 3A174C  02200      LD      A,(MISS)
4B8F FE25    02210      CP      2SH              ;NO. OF BALLS
4B91 CACD4B  02220      JP      Z,OVER
4B94 C9      02230      RET
02240 ; DISSCR DISPLAYS THE VALUE IN THE REGISTER A AT THE
02250 ; LOCATION CONTAINED IN THE HL REGISTER PAIR.
4B95 CD9E4B  02260 DISSCR CALL    CONV          ;CONVERT TO 2 DIGITS IN BC PAIR
4B98 78      02270      LD      A,B              ;DIGIT 1 TO A
4B99 77      02280      LD      (HL),A          ;DISPLAY IT
4B9A 79      02290      LD      A,C              ;DIGIT 2 TO A
4B9B 23      02300      INC      HL              ;NEXT LOCATION
4B9C 77      02310      LD      (HL),A          ;DISPLAY IT
4B9D C9      02320      RET
02330 ; CONV CONVERTS THE VALUE IN THE A REGISTER TO TWO
02340 ; ASCII DIGITS IN THE BC REGISTER PAIR.
4B9E 47      02350 CONV  LD      B,A              ;SAVE A
4B9F E60F    02360      AND      0FH            ;MASK OUT BITS 4-7
4BA1 CDB54B  02370      CALL    CONV2          ;CONVERT A TO ASCII
4BA4 4F      02380      LD      C,A              ;PUT RESULT IN C REGISTER
4BA5 78      02390      LD      A,B              ;RETRIEVE A
4BA6 E6F0    02400      AND      0F0H          ;MASK OUT BITS 0-3
4BA8 CB3F    02410      SRL      A              ;BRING BITS 4-7 INTO BITS 0-3
4BA9 CB3F    02420      SRL      A
4BAC CB3F    02430      SRL      A
4BAE CB3F    02440      SRL      A
4BB0 CDB54B  02450      CALL    CONV2          ;CONVERT A TO ASCII
4BB3 47      02460      LD      B,A              ;SAVE TO B
4BB4 C9      02470      RET
02480 ; CONV2 CONVERTS THE A REGISTER TO ITS ASCII EQUIVILENT
4BB5 FE0A    02490 CONV2 CP      0AH            ;IS CHARACTER >=A
4BB7 DABC4B  02500      JP      C,CONV3        ;NO..JUMP TO CONV3
4BBA C607    02510      ADD      A,7            ;ADJUST FOR ALPHABETIC CHARACTERS
4BBC C630    02520 CONV3 ADD      A,30H         ;CONVERT TO ASCII
4BBE C9      02530      RET
4BBF CD8A4A  02540 FIXX1 CALL    FIXX
4BC2 C34D4A  02550      JP      INCY
02560 ;DISP DISPLAY MESSAGE POINTED BY HL AT DE
4BC5 EDS32040 02570 DISP LD      (4020H),DE
4BC9 CDA728  02580      CALL    28A7H
4BCC C9      02590      RET
02595 ; OVER DISPLAYS MESSAGES 4-8 AND AWAITS INPUT
4BCD E1      02596 OVER POP      HL
4BCE 21324C  02600      LD      HL,MES4
4BD1 11EE3D  02610      LD      DE,15854
4BD4 CDC54B  02620      CALL    DISP
4BD7 21444C  02630      LD      HL,MES5
4BDA 11AE3E  02640      LD      DE,16046
4BDD CDC54B  02650      CALL    DISP
4BE0 21554C  02660      LD      HL,MES6
4BE3 11EE3E  02670      LD      DE,16110
4BE6 CDC54B  02680      CALL    DISP
4BE9 21604C  02690      LD      HL,MES7
4BEC 116E3F  02700      LD      DE,16238
4BEF CDC54B  02710      CALL    DISP
4BF2 21714C  02720      LD      HL,MES8
4BF5 11AE3F  02730      LD      DE,16302
4BF8 CDC54B  02740      CALL    DISP
4BFB 3A4038  02750 INPT  LD      A,(14400)
4BFE B7      02760      OR      A
4BFF 28FA    02770      JR      Z,INPT
4C01 FE01    02780      CP      1

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4C03 CA004A 02790 JP Z,INIT
4C06 FE04 02800 CP 4
4C08 20F1 02810 JR NZ,INPT
4C0A CDC901 02820 CALL 1C9H
4C0D C3CC06 02830 JP 6CCH
4C10 00 02840 XCOOR DEFB 0 ;X COORDINATE
4C11 00 02850 YCOOR DEFB 0 ;Y COORDINATE
4C12 01 02860 XINC DEFB 1 ;X INCREMENT VALUE
4C13 01 02870 YINC DEFB 1 ;Y INCREMENT VALUE
4C14 0000 02880 BATLOC DEFW 0 ;BAT LOCATION
4C16 00 02890 HIT DEFB 0 ;HIT SCORE INITIAL VALUE
4C17 00 02900 MISS DEFB 0 ;MISS SCORE INITIAL VALUE
4C18 54 02910 MES1 DEFM 'T E N N I S' ;1 SPACE BETWEEN LETTERS
4C23 00 02920 DEFB 0
4C24 48 02930 MES2 DEFM 'HITS:'
4C29 00 02940 DEFB 0
4C2A 4D 02950 MES3 DEFM 'MISSES:'
4C31 00 02960 DEFB 0
4C32 2A 02970 MES4 DEFM '*** GAME OVER ***'
4C43 00 02980 DEFB 0
4C44 50 02990 MES5 DEFM 'PRESS <ENTER> TO'
4C54 00 03000 DEFB 0
4C55 50 03010 MES6 DEFM 'PLAY AGAIN'
4C5F 00 03020 DEFB 0
4C60 50 03030 MES7 DEFM 'PRESS <BREAK> TO'
4C70 00 03040 DEFB 0
4C71 54 03050 MES8 DEFM 'TERMINATE'
4C7A 00 03060 DEFB 0
4A00 03070 END INIT
00000 TOTAL ERRORS

```

```

BATLOC 4C14 02880 00230 01160 01250 01350 01420 01522
BORDER 4B44 01840 00260
CONT 4A61 00610 01030
CONV 4B9E 02350 02260
CONV2 4BB5 02490 02370 02450
CONV3 4BBC 02520 02500
DELAY 4A83 00790 00350
DISP 4BC5 02570 01950 01980 02010 02620 02650 02680 02710
02740
DISSCR 4B95 02260 02100 02190
FIXX 4A8A 00850 01590 02540
FIXX1 4BBF 02540 00480
FIXY 4A9D 00960 00570 00590
GETRND 4B37 01780 01690
GRAFIX 4A73 00700 00660 00680
HIT 4C16 02890 00200 02050 02080
INCHIT 4B6F 02050 01580
INCMIS 4B7E 02140 01630
INCX 4A39 00400
INCY 4A4D 00510 02550
INIT 4A00 00150 02790 03070
INIT1 4A2A 00320 01660
INITRM 4A1F 00280
INPT 4BFB 02750 02770 02810
KBOARD 4AB2 01060 00360
LOOP 4A2D 00340 00620
LOOP1 4B4E 01880 01900
MES1 4C18 02910 01930
MES2 4C24 02930 01960
MES3 4C2A 02950 01990
MES4 4C32 02970 02600
MES5 4C44 02990 02630
MES6 4C55 03010 02660
MES7 4C60 03030 02690
MES8 4C71 03050 02720
MESGES 4B53 01930 00160
MISS 4C17 02900 00210 02140 02170 02200
MOVDN 4AE3 01340 01120
MOVUP 4AC2 01150 01100
OVER 4BCD 02596 02220
POINT 4A67 00650 01530
RANDOM 4B27 01680 00320

```

00410 00490 00710 00850 00890 01730
 00180 00900 00920
 00400 00960 00990 01710
 00190 00520 00730 00960
 00510 00970 01000 01020

00370
 00460
 00340
 00610
 01410
 01240
 00180 00900 00920
 00400 00960 00990 01710
 00190 00520 00730 00960
 00510 00970 01000 01020

4A71 00690
 4A4A 00490
 4A5E 00600
 4B1B 01630
 4A6C 00670
 4B04 01521
 4A40 00450
 4A54 00560
 4AFD 01470
 4ADE 01300
 4C10 02840
 4C12 02860
 4C11 02850
 4C13 02870

RESET
 SAUX
 SAUY
 SERVE
 SET
 TEST
 TESTX
 TESTY
 TOOBIG
 TOOSML
 XCOOR
 XINC
 YCOOR
 YINC

**** NEXT MONTH'S ISSUE****

Next months issue will contain at least the following programs plus the usual features, articles, news, letters, etc..

** KEYNOTE (L1/4K) **

An educational game in which the computer draws musical notes on the screen and you have to identify them. A great help for someone just learning music.

** PINBALL MACHINE (L1/4K) **

This is one pinball machine that you can't tilt! If only you could find a way to charge 20c for 5 shots, this program would make your fortune.

** TBUG2 (L2.m1) **

A nice modification to the TANDY TBUG program that gives a full screen width dump of memory to the M command and has a user controlled stop/start scrolling action as well. Don't be misled, we are not publishing the TBUG program itself, just the modifications.

** MURDER (L2/16K) **

Detective type game in which you have to puzzle out who killed who with what, when and where. But there is one small catch, (pun intended) when you catch him/her, they are liable to fight back. Complete with graphic floor plans of each floor showing you and the other occupants.

** MICROHEX (L2/4K) **

Converts a Decimal number to Hex, Hex to Decimal, lets the user input the Decimal address to be jumped to in a USR call and decodes it down into the values to be poked as MSB and LSB and lets the user input Memory usage and tells him what to poke into the variable pointers when chaining programs. It's all done in under 2K of basic so that you can see how it's done as well.

** ASTRONOMY (L2/16K) **

If you are interested in Astronomy you will find this program very useful. Here are just some of its features...Time conversions, co-ordinate conversions, precession, solar calculations, solar elongations, planetary calculations, lunar calculations..etc

)-80 *****
appropriate.

with your name
System 1 or 2,
name and address
the accompanying

what the program

close stamps or

***** CASSETTE EDITION INDEX *****

The cassette edition of MICRO-80 contains all the software listed each month, on cassette. All cassette subscribers need do is CLOAD and RUN the programs. Level II programs are recorded on Side 1 of the cassette and Level I programs on Side 2. All programs are recorded twice in succession. The rates for a cassette subscription are printed on the inside front cover of each issue of the magazine.

			APPROX. START POSITION		
			<u>CTR-41</u>	<u>CTR-80</u>	<u>SYS 80</u>
<u>SIDE 1</u>					
C WORD	L2/4K	W	10 32	7 22	5 15
CHES BOARD	L2/16K	S	53 103	36 70	25 50
CELLAR CONTROL	L2/16K	C	150 180	102 122	70 85
LIFE (m1.)	SYSTEM	LIFE	205	140	100
	MEM SIZE =	30314	215	146	103
LIFE (BASIC)	L2/16K	L	227 240	154 162	108 113
LIFE (Source)	EDTASM	LIFE	250 280	170 192	120 135
TENNIS (m1.)	L2/4K SYSTEM	TENNIS	310 320	212 218	148 153
TENNIS (Source)	EDTASM	TENNIS	330	223	156
<u>SIDE 2</u>					
SHOOTING GALLERY	L1/4K	-	45 103	30 70	- -
MATURITY TEST	L1/4k	-	160 215	108 145	- -

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MICRO-80

LEVEL II ROM REFERENCE MANUAL

by Edwin Paay

Published by MICRO-80 PRODUCTS

Written by Eddy Paay, the LEVEL II ROM REFERENCE MANUAL is the most complete explanation of the Level II BASIC interpreter ever published.

Part 1 lists all the useful and usable ROM routines, describes their functions explains how to use them in your own machine language programs and notes the effect of each on the various Z 80 registers.

Part 1 also details the contents of system RAM and shows you how to intercept BASIC routines as they pass through system RAM. With this knowledge, you can add your own commands to BASIC, for instance, or position BASIC programs in high memory—the only restriction is your own imagination!

Part 2 gives detailed explanations of the processes used for arithmetical calculations, logical operations, data movements, etc. It also describes the various formats used for BASIC, SYSTEM and EDITOR/ASSEMBLER tapes. Each section is illustrated by sample programs which show you how you can use the ROM routines to speed up your machine language programs and reduce the amount of code you need to write.

The LEVEL II ROM REFERENCE MANUAL is intended to be used by machine language programmers. It assumes a basic understanding of the Z 80 instruction set and some experience of Assembly Language programming. But BASIC programmers too will benefit from reading it. They will gain a much better insight into the functioning of the interpreter which should help them to write faster, more concise BASIC programs.

MICRO-80